March 23, 1942

STEEL

PRODUCTION • PROCESSING • DISTRIBUTION • USE

ESTABLISHED 1882

FASTER and FASTER

ASSEMBLY *with* Speed Nuts

Where Aircraft Attachments have been changed over to SPEED NUTS and SPEED CLIPS, savings of 50% in cost and reduction of 70% in weight were almost universal. Where vibration loosening was a problem, SPEED NUTS have solved it. Send us your assembly problems now and we will rush samples and engineering data without delay.

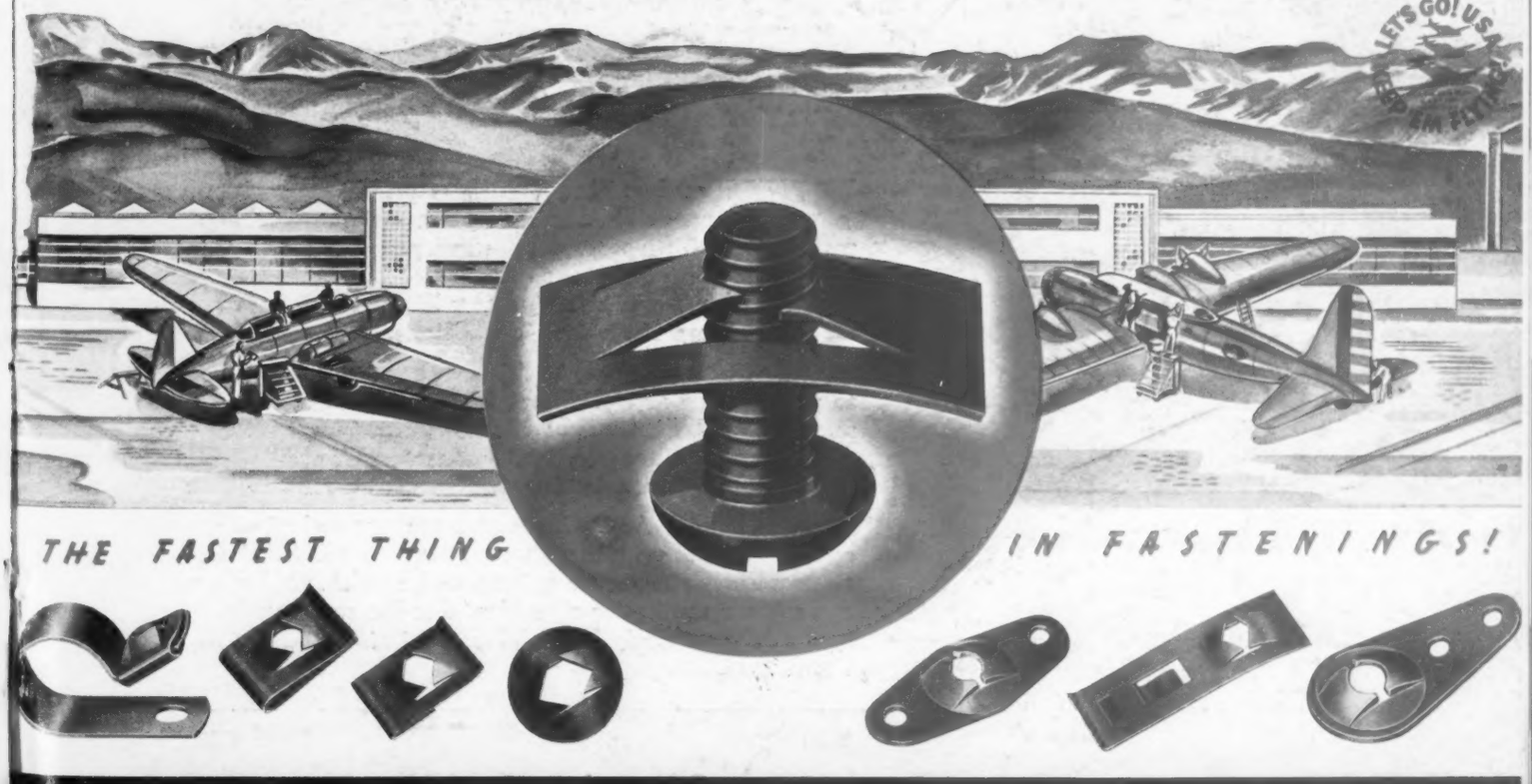
TINNERMAN PRODUCTS, INC.

MANUFACTURERS OF PATENTED SPEED NUTS

2039 FULTON ROAD, CLEVELAND, OHIO

IN CANADA: Wallace Barnes Co., Ltd., Hamilton, Ontario

IN ENGLAND: Simmonds Aerocessories, Ltd., London



THE FASTEST THING IN FASTENINGS!

OVER A BILLION IN USE ★ ★ OVER 1,000 SHAPES AND SIZES

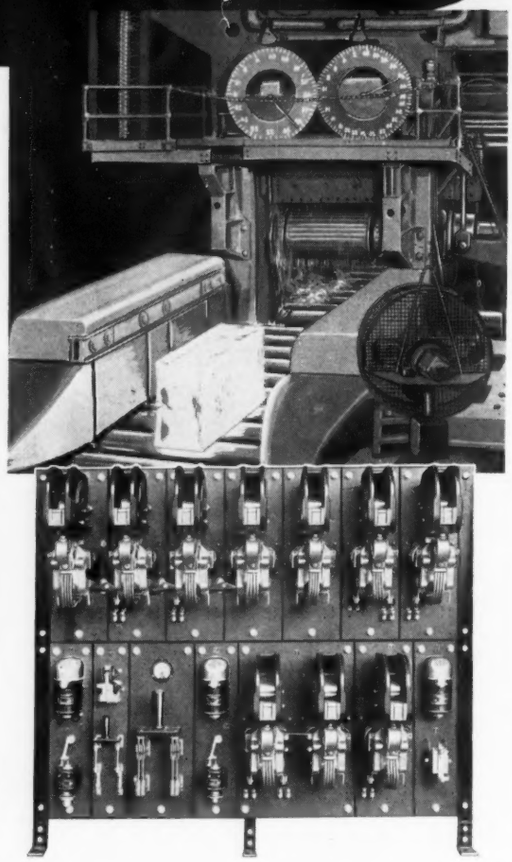
THE WORLD'S **FASTEST** 600 AMP. CONTACTOR

NOW AT WORK

ON VITAL WAR PROJECTS

ON GUN HANDLING CRANES

ON BLOOMING MILL SCREW DOWN



Greater speed in adjusting roll-openings in Ohio steel mill is now possible by this recently installed EC&M Controller with new 600 ampere Contactors.

Inserting liners in gun barrels involves precision movements—accurate response by this EC&M Wright Circuit Crane-hoist Controller with the new 600 ampere Contactors.

THE ELECTRIC CONTROLLER & MFG. CO. EC&M CLEVELAND, OHIO

WHEN modernizing existing equipment or installing new units, many of America's plants—the arsenal of the democracies—are utilizing every opportunity to produce more in less time. Typical of this trend is the selection of EC&M D-c Magnetic Control with the World's Fastest new EC&M 600 ampere Contactor for these changeovers or new additions.

The quicker response of this new contactor permits an operator to get material or equipment into position faster and with fewer movements. This faster positioning helps increase production and accuracy. Furthermore, hitting the "bull's-eye" when adjusting rolls or setting crane loads reduces wear on motors and machines.

EC&M *LINE-ARC* Contactors are not only fast-operating but operate with low up-keep, too. Due to the *LINE-ARC* principle, contact-life has been greatly increased, resulting in less maintenance and greater continuity of service. For D-c crane and mill auxiliary motor drives, specify EC&M Bulletin 1145-B *LINE-ARC* Magnetic Contactor Control.

HEAVY DUTY MOTOR CONTROL FOR CRANES, MILL DRIVES AND MACHINERY • BRAKES • LIMIT STOPS • LIFTING MAGNETS AND AUTOMATIC WELD TIMERS.

When Modernizing -- Specify **EC&M** *LINE-ARC CONTACTORS*

A NEW MOLY-COBALT STEEL

for tough cutting jobs

Here's a high-speed steel designed to give increased service when the cutting edge of the tool is working at elevated temperature.

We call this new moly-cobalt steel Bethlehem Moco.

Moco contains, roughly, 5 per cent molybdenum, 2 per cent vanadium, 5.25 per cent tungsten, 4 per cent chromium . . . *plus approximately 5.25 per cent cobalt.* The cobalt makes the tool retain its great cutting power as the surface temperature creeps up.

Moco is not an untried steel. We've put it through its paces for months on the toughest jobs in our plants. It has given an excellent account of itself. In fact, Moco has done a consistently better job than the steel it is replacing (an 18-4-1+ cobalt steel ruled out by the tungsten shortage).

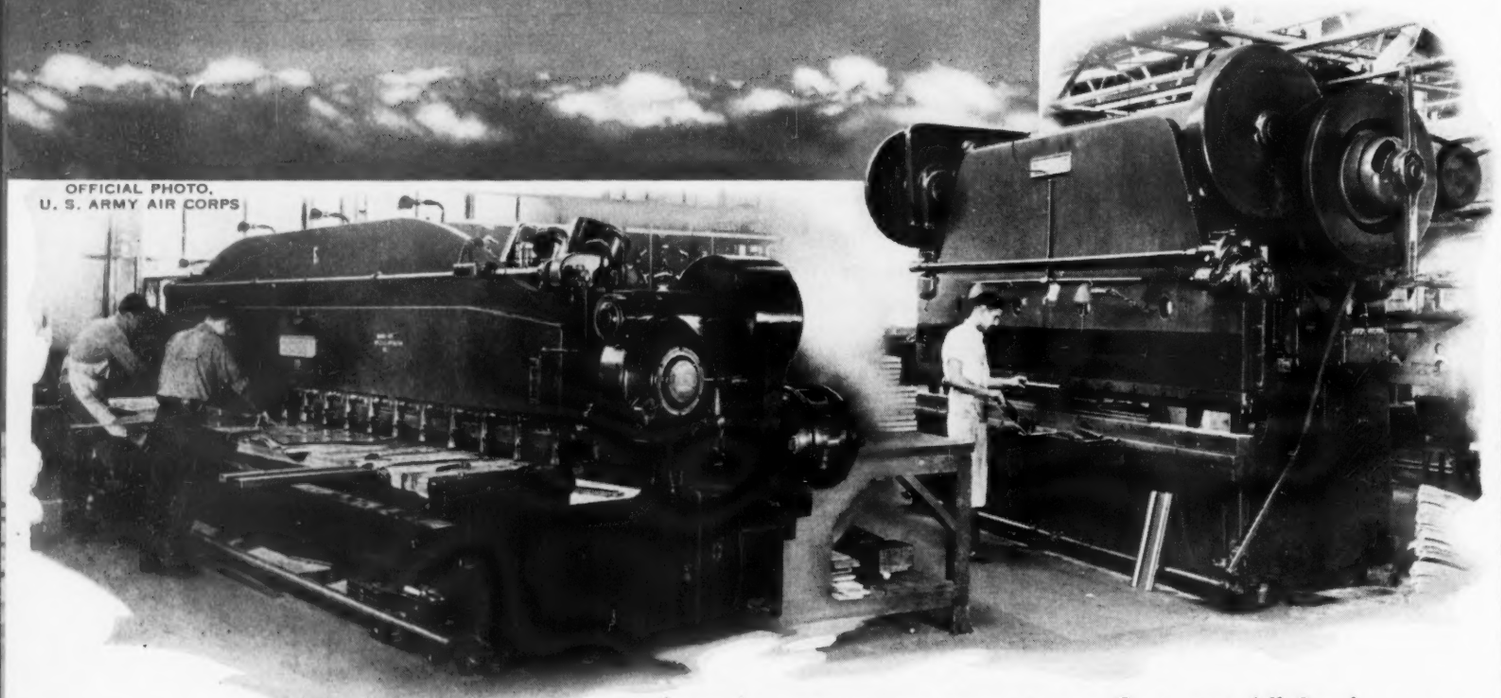
We offer this new steel to you with the belief that after you've used it, learned how to handle it, you'll make it a stand-by in your shop.

Use Moco for the following jobs: axle-turning tools, tool bits, boring tools, tools for cutting hard iron, corrugating tools, cutting-off tools, shaper tools, tire-turning and wheel-turning tools and other comparable operations. Moco is especially well adapted for deep heavy cuts.

Write to Bethlehem Steel Company, Bethlehem, Pa., for further information about Moco, its properties and treatment.

BETHLEHEM STEEL

BETHLEHEM STEEL COMPANY



OFFICIAL PHOTO,
U. S. ARMY AIR CORPS

Metal sheets for aircraft are sheared to micrometer accuracies on Cincinnati All-Steel Shears, and accurate Cincinnati Steel Press Brakes form parts that fit together easily.
Write for recommendations on your job.

THE CINCINNATI SHAPER COMPANY, CINCINNATI, OHIO

SHAPERS • SHEARS • BRAKES • PRESSES

Handling Materials for WAR INDUSTRIES

EASTON is building the following types of equipment to meet the material handling requirements of all industries directly or indirectly engaged in war production:

INDUSTRIAL CARS
for hand or locomotive haul, or electric

INDUSTRIAL TRAILERS AND SEMI-TRAILERS
for hand, tractor or motor-truck haul

ELECTRIC TRUCKS
load-carriers, low-lifts and tier-lifts

DUMP BODIES • TURNTABLES • ACCESSORY EQUIPMENT

ENGINEERING COUNSEL — So that you may haul bigger payloads today — and every day — Easton Engineers are at your service. When you can't wait for deliveries on new equipment, a practical Easton survey may show you the way to immediate speed-ups, may help you to get better service from old equipment, or may assist in locating serviceable equipment. Write to Engineering Counsel, Easton Car & Construction Company, Easton, Pa.

EASTON

EASTON CAR & CONSTRUCTION COMPANY • EASTON, PA.

Behind the Scenes with STEEL

Gambling For Victory

■ Out at Inland Steel continuing record production of pig iron and steel for making the tools of war is taken as part of the day's work, but 50 supervisors have come up with a defense bond selling idea which they can recommend to the Treasury department as sure fire.

These superintendents and their assistants meet daily to discuss common production problems and for lunch on the top floor of Inland's office at Indiana Harbor. One day in January the talk turned to man's love of gambling and Al Castle, who superintends over in the cold strip mill, suggested a daily drawing with defense bonds as prizes.

Since then there has been at least one drawing every day and sometimes three, with a $25 defense bond to the winner. Eighty-five bonds have been distributed with luck being fairly well divided, although two or three men have yet to win, while several have won five each, including the plan's originator, Mr. Castle.

Here is the system, for the benefit of anyone else who wants to try it out:

Nineteen men each ante a dollar and nineteen numbers are inserted in the backs of old Red Cross buttons. A guest usually makes the drawing, and since each bond costs only $18.75, two-bits remains. Saved for 75 drawings, the quarters finance a bond for a free drawing.

Geography Lesson

■ You may recall that we quoted a nice pat on the back from John A. Cowan in a recent issue, and this he now writes us, he didn't mind in the least. What Mr. Cowan did not like, however, was the fact that we put Bridgeton in New York, and we don't blame him.

Bridgeton, says Mr. C., is good old South Jersey to the bone—tomatoes, oysters, fishing—yes, and mosquitoes, too, and he asks us to drop in and see him anytime—in New Jersey.

One Out Of Five!

■ We feel sure you will be interested in the remarks of William K. Opdyke, Training Specialist, Training within Industry, WPB, after reading STEEL's article on Job Instructor Training two weeks ago. He writes:

We feel certain that this interesting explanation of the J.I.T. Program will go a long ways toward interesting those war production contractors that have not as yet "signed up" for this training.

The problem of securing and training an adequate supply of lead men is indeed going to be even more outstanding. At present there are approximately 5,400,000 people employed in war production work. It is estimated that another additional 10,000,000 workers will be required in war factories during 1942. This means job upgrading on a mass scale to meet skilled labor and lead men requirements. On the basis of one lead man for every 10 workers,—and bearing the above figure in mind, it is interesting to note that approximately 1,000,000 new lead men will be required to direct operations of the estimated 10,000,000 new workers. From this we might assume that about one out of every five of the present war plant personnel will be in some sort of a lead capacity before the end of this year.

From H.Q.

■ Just so you won't labor under any false impression that STEEL's Guide to Priorities, Allocations and Prices isn't still clicking like a pair of hot ivories, read over our shoulder what Nathan Steinberg, Pumbing & Heating Branch, WPB writes this week:

I think your editors are performing a tremendous service to the war effort with this section on Priorities, Allocations, Prices. My file won't be complete without one.

Alliterate Axles

■ The Timken-Detroit Axle Co. has joined the sloganers with this gem which goes on all pay envelopes and in all their advertising:

Timken's Job: To Axe the Axis with Axles!

The Doughty Dutch

■ What may well have been one of the last pieces of mail out of Java landed on our desk this week, and if we could by some long-lost art of magic impart to it the power of speech, what a tale it could tell!

Passed by both the Dutch and American censors it came from the Supply Section of the War Department at Bandoeng—an innocent Helpful Literature card from the October 20, 1941 issue of STEEL. On it some indomitable Dutch officer had neatly circled two pieces of literature he would like to see and in a note below had reverted to the typical Dutch use of double letters in requesting the "coppys" be sent in "twofold".

We're sorely afraid it's too late, but we are forwarding on to Warner & Swasey Co. our regular form covering two copies of their 176-page pocket-size catalog and manual on turret lathe tools and to the B. F. Goodrich Co. for their 8-page catalog on "Ameripol D" synthetic rubber.

Six months ago, in our unwordliness we had never even heard of Bandoeng and it would have even taken us a few minutes to have spotted Java accurately on a map. Bandoeng is as close and familiar now as our home town itself and with just as much vigor will we win it back!

Vol. 110, No. 13, March 23, 1942, issue of STEEL, published every Monday at Cleveland, O. Entered as second class matter at the postoffice, Cleveland, O., under act of March 3, 1879. U. S. and possessions, Canada, Mexico, Cuba, Central and South America, 1 year $6; 2 years $10; all other countries, 1 year $12. Current issues, 25c. Yearbook of Industry issue, $2.00

Buy a Defense Bond—Today!

The War *is being decided*
AT YOUR MACHINE
● Every product, part and piece you turn out is that much more for America's victory; every product, part or piece you could turn out – but don't – is that much more for Japan.
YOU CAN TURN IT BETTER, FASTER, FOR LESS...WITH A WARNER & SWASEY
★
WARNER & SWASEY
Turret Lathes
Cleveland

Save Steel for the Armed Forces

and build transportation equipment with greater payloads—

use **N-A-X**

High Tensile

Thousands of tons of steel can be diverted to the armed forces by building transportation units of N-A-X HIGH TENSILE. For it is an established fact that it takes fewer tons of steel to produce transportation equipment of a given strength factor with N-A-X HIGH TENSILE than with plain carbon steel. And the equipment will last longer, and cost less to operate.

N-A-X HIGH TENSILE has very high resistance to IMPACT and FATIGUE, regardless of weather conditions —in sub-zero cold or blistering heat. This means that rolling equipment built of N-A-X HIGH TENSILE will withstand the destructive forces of SHOCK, STRESSES, IMPACT and FATIGUE, resulting from rough roads and adverse operating conditions.

N-A-X HIGH TENSILE goes through each step in fabrication smoothly, quickly. Its welding characteristics are excellent, responding equally well to all types. And because it is highly ductile, it can be cold formed with the ease and speed of mild carbon steel.

N-A-X HIGH TENSILE'S other important properties are: high yield point, high ultimate strength and greatly increased resistance to corrosion and abrasion.

For additional information about N-A-X HIGH TENSILE and its use in transportation equipment, or for other applications, ask for a Great Lakes engineer to call. He will show you how hundreds of others are using this remarkable low alloy steel to marked advantage. Save steel for the armed forces and at the same time increase the pay load of your equipment. Specify and use N-A-X HIGH TENSILE.

Send for Booklet on our N-A-X 9100 Series—the Versatile Steel

LIST OF PRODUCTS

Hot Rolled Strip (down to 1 inch wide) . . . Hot Rolled Strip Sheets (up to 91 inches wide) . . . Spring Steel (carbon and alloy) . . . Merchant Bars . . . Forging Bars . . . Automobile Bumper Sections . . . Bar Mill Sections . . . N-A-X HIGH TENSILE Bars, Shapes, Sheets, Billets . . . Sheet Bars . . . Hot and Cold Rolled Sheets . . . Michigan Metal for Vitreous Enameling . . . Deep Drawing Quality (in all grades, widths up to 91 ins.) . . . Stran-Steel Metal Framing for Residential and Commercial Construction.

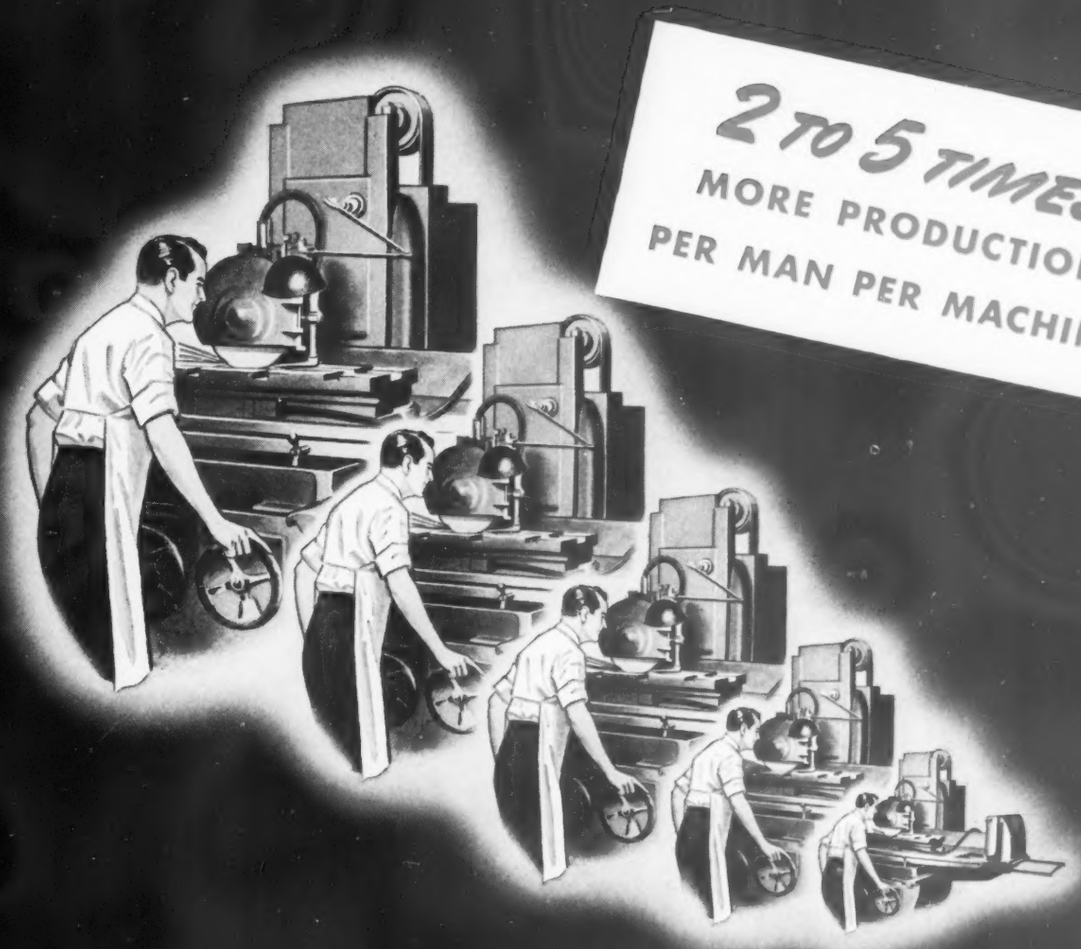
GREAT LAKES STEEL CORPORATION—DETROIT, MICHIGAN

Sales Offices in Principal Cities

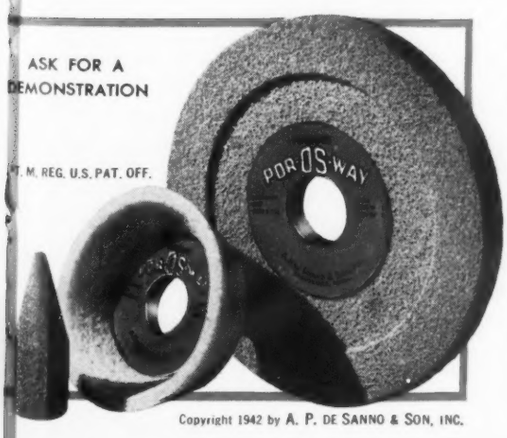
division of NATIONAL STEEL

NATIONAL STEEL CORPORATION

Executive Offices, Pittsburgh, Pa.



A new Grinding Wheel that practically eliminates an old bugaboo called "burning"



Copyright 1942 by A. P. DE SANNO & SON, INC.

ONCE IN A WHILE a development comes along that knocks old ideas into a cocked hat. That has just happened to grinding wheels. A new wheel, named Por-os-way, is taking cuts you never dreamed of before, stepping up production per man per machine 2 to 5 times and practically eliminating burns.

The success of the Por-os-way wheel is the result of an entirely new structure. The Por-os-way wheel has millions of air cells that cool each grinding point. Yet the wheel—for all its porosity—is tough and strong due to a new vitrified bond and a "stringy" texture produced by an exclusive patented process. You can see the difference easily with your naked eye but you'll have to try Por-os-way to believe how much faster, cooler and free cutting it works, how it holds its corner, and how little dressing it requires.

Try the Por-os-way wheel on hardened tool and die steels, and on softer materials such as tin, aluminum, copper, wood, rubber and plastics. Write today for a trial demonstration. A. P. DE SANNO & SON, INC., 436 Wheatland Street, PHOENIXVILLE, PENNSYLVANIA.

POR-OS-WAY* *a new* **RADIAC* PRODUCT**

Give your Taps a "BREAK" or they will BREAK

KEEP them in good condition by sharpening them frequently. Use dulls them as it does all cutting tools and when dull they are likely to chip, break and produce rough or oversize threads.

Here are some suggestions which will help you get utmost service from your taps:

1. The minute a tap begins to get dull, sharpen it.

2. Take light grinding cuts to avoid "burning" the cutting edges.

3. Use a tap chamfer grinding machine, if possible, as it reproduces the original grind accurately. There are several good ones on the market. If you must grind by hand, note the following:

a. As a rule, grind the chamfered portion only. (Note the diagrams which show correct results of grinding and—exaggerated—two common errors.)
b. Have a new tap handy for comparison regarding number of threads chamfered.
c. Use a soft 80 grain wheel.

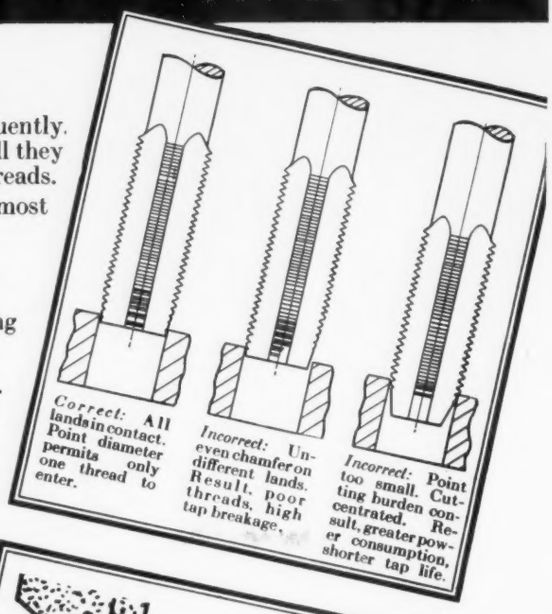
4. If tap needs grinding in flute, to touch up the edges, use a universal grinding machine and a hard 60 grain wheel. Use a saucer wheel for a radial or straight rake and a disc wheel formed to the hook for a hooked rake. (Note the sketches which show how to handle this job.)

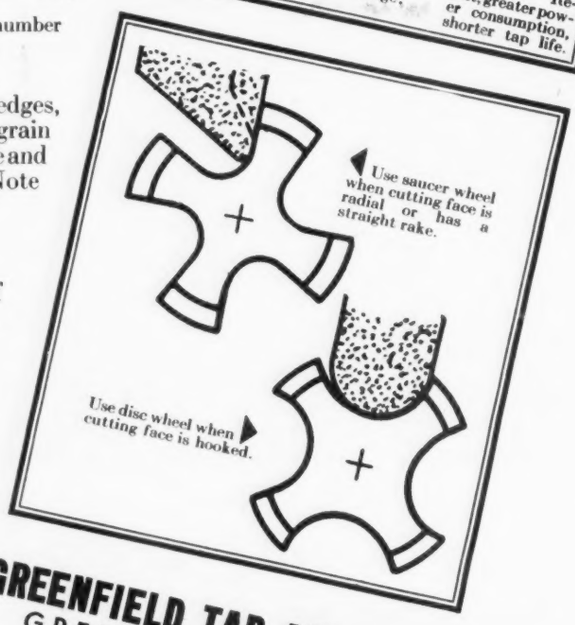
5. Completely grind away any broken teeth.

6. Polish the ground portion after sharpening if you are tapping soft or stringy materials that have a tendency to "load" the tap.

7. Taper Pipe Taps should always be machine ground and mechanically indexed to eliminate tapping out-of-round holes.

Remember that all taps become dull when in constant use. It takes more power to drive them and they often slow down the tapping machine resulting in lower production and excessive tap wear. *Keep your taps sharp.*


Correct: All lands in contact. Point diameter permits only one thread to enter.
Incorrect: Uneven chamfer on different lands. Result, poor threads, high tap breakage.
Incorrect: Point too small. Cutting burden concentrated. Result, greater power consumption, shorter tap life.



This is one of a series of advertisements published by Greenfield Tap & Die Corporation to help users get greater production from their small tools in these critical times, through making useful facts more widely known

GREENFIELD TAP AND DIE CORPORATION
GREENFIELD • MASSACHUSETTS
DETROIT PLANT: 2102 West Fort St.
WAREHOUSES in New York, Chicago and Los Angeles
In Canada:
GREENFIELD TAP AND DIE CORP. OF CANADA, LTD., GALT, ONT.

GTD GREENFIELD
TAPS · DIES · GAGES · TWIST DRILLS · REAMERS · SCREW PLATES · PIPE TOOLS

Brown Radiamatic installed on Rotary Heating Furnace at Utica Drop Forge & Tool Co., Utica, N. Y.

What Users Like

about BROWN RADIAMATIC PYROMETERS

1. Convenient to operate and universal in application for the measurement and control of temperatures.
2. Built to withstand severe industrial vibration, designed for continuous operation and long life service.
3. Completely self-contained. Built-in compensator—compensates for ambient temperature changes up to 250°F.
4. Can be sighted on hot objects, moving or still. Continuously measures and controls the temperature of furnace or work.
5. Measures and records temperatures beyond the range of conventional thermocouples.
6. Extremely responsive—will not overshoot.
7. Interchangeable accessories for all industrial applications.
8. Accuracy is unaffected by dust, dirt, fumes, or corrosive atmospheres. Neat in appearance—Easily installed—The Brown Radiamatic consists essentially of a heat-resisting lens, a compensator and a thermopile.
9. The heat radiated from the hot object falls on the lens and is focused on the thermopile which generates an E.M.F. proportional to the true temperature.
10. Users of Brown Radiamatics have found temperature measurement by the radiation principle highly accurate and dependable. Substantial saving in fuel and operator's time has been proven—Spoilage is reduced and better quality attained. Speed up production by using Brown Radiamatic Pyrometers.

Write for information.

BROWN POTENTIOMETER CONTROLLERS

THE BROWN INSTRUMENT COMPANY, 4462 WAYNE AVENUE, PHILADELPHIA, PENNSYLVANIA
DIVISION OF MINNEAPOLIS-HONEYWELL REGULATOR CO.
MINNEAPOLIS, MINNESOTA AND 119 PETER STREET, TORONTO CANADA
WADSWORTH ROAD, PERIVALE, MIDDLESEX, ENGLAND. NYBROKAJEN 7, STOCKHOLM, SWEDEN

"PHOENIXLOY"

CAST ALLOY IRON ROLL

FOR COLD REDUCTION AND TEMPER ROLLING

FOR AN IMPROVED FINISH

Pittsburgh Rolls are made for every rolling operation and every variety of mill.

UNUSUAL FINISHING QUALITIES

CAN BE SHOT BLAST FINISHED

CAN BE BRIGHT FINISHED

UNUSUAL STRENGTH

EXTREME HARDNESS

Pittsburgh ROLLS

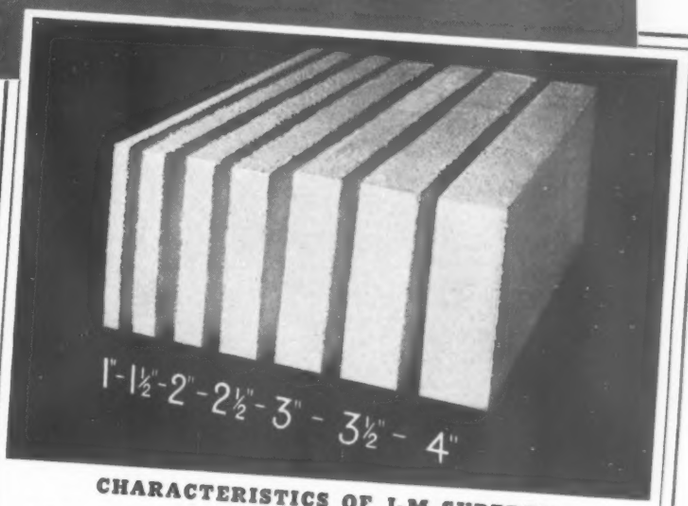
PITTSBURGH ROLLS DIVISION of BLAW-KNOX CO — "Steel's Partner" • PITTSBURGH, PA.

J-M SUPEREX

. . . the most widely used block insulation for temperatures between 600° F. and 1900° F.

Throughout the Iron and Steel industries, J-M Superex has long been recognized as the standard block insulation for temperatures up to 1900° F. behind refractory linings.

Made of high-quality, calcined diatomaceous silica, bonded with asbestos fiber and formed into large, easily handled blocks, Superex provides both high heat resistance and exceptional insulating efficiency. For complete information, write for IN-101A. Johns-Manville, 22 East 40th Street, New York, N. Y.



CHARACTERISTICS OF J-M SUPEREX

LOW THERMAL CONDUCTIVITY—the billions of tiny "dead air cells" in J-M Superex present a formidable barrier to the passage of heat . . . are largely responsible for its low thermal conductivity.

HIGH HEAT RESISTANCE—J-M Superex Blocks safely withstand temperatures up to 1900° F

LIGHT WEIGHT—Approximately 24 lbs. per cu. ft.

HIGH PHYSICAL STRENGTH—Withstands vibration and other physical abuse encountered in normal service. Approximately 4 tons pressure per square foot are required to compress Superex ⅛ inch.

PERMANENT EFFICIENCY—Superex maintains its high thermal efficiency indefinitely—will not disintegrate in the service for which it is recommended.

QUICK APPLICATION—The convenient sizes and light weight of Superex assure fast, economical installations.

EASY CUTTING AND FITTING—Superex may be easily cut with an ordinary knife or saw for fitting around openings or irregular surfaces.

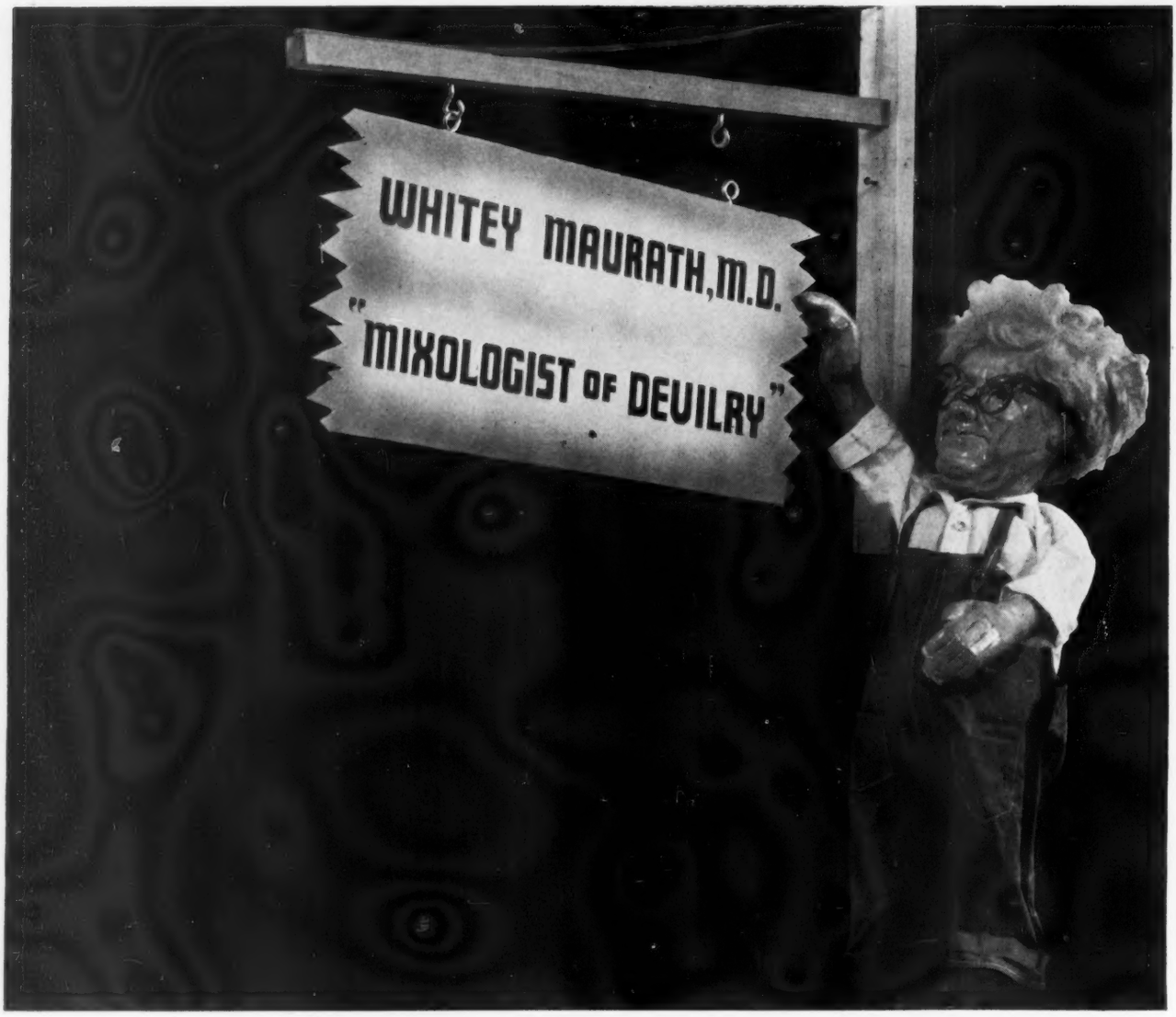
JM PRODUCTS

Johns-Manville INDUSTRIAL INSULATIONS

for every temperature . . . for every service

●

Superex . . . 85% Magnesia . . . Insulating Fire Brick (*4 types*) . . . Insulating Brick (*3 types*) J-M No. 500 Cement . . . Sil-O-Cel C-3 Concrete . . . Marinite.

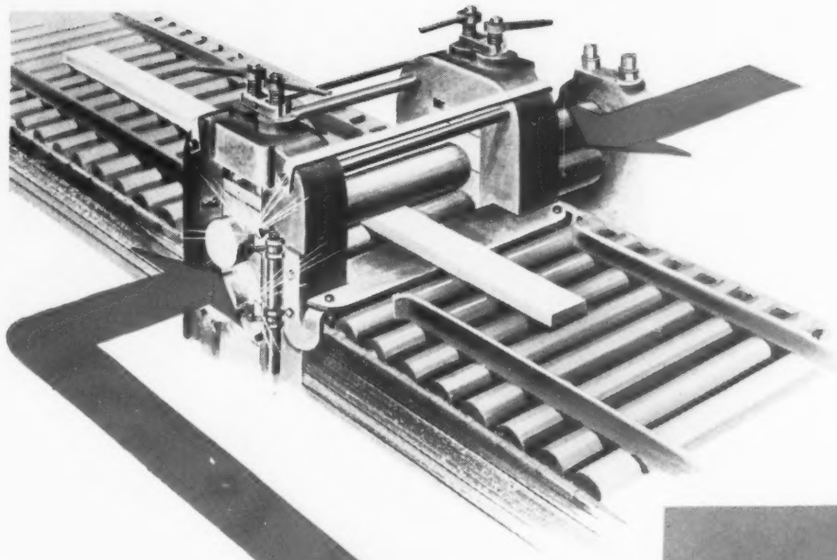


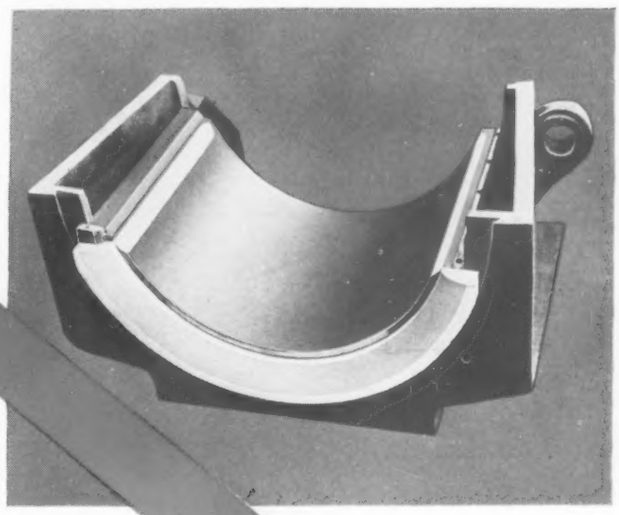
WHITEY SEZ: *"HIPPOCRATES, THE CELEBRATED GREEK PHYSICIAN, SAID THAT THERE ARE SOME REMEDIES WORSE THAN THE DISEASE . . . AND A GOOD, MODERN DAY METALLURGIST CAN DIAGNOSE MANY A STAINLESS WELDING PROBLEM BY A PROPER ANALYSIS OF THE 'REMEDY'."*

STAINLESS Type Numbers Available		
302-B	316	330
308	316-Cb.	347
309	317	410
309-Cb.	321	430
310	325	442
311	329	446
312	•	502
15% Cr.—65% Ni.		
20% Cr.—80% Ni.		

MAURATH, Inc. **CLEVELAND**

Builder of better welding electrodes in all analyses





MORE TONNAGE

YOU GET IT FROM MICARTA ROLL NECK BEARINGS

Here's a way to get more tonnage—and keep on getting it! Run your rolls on Westinghouse Micarta Roll Neck Bearings made especially for heavy-duty rolling.

You'll have fewer time-outs for replacement or adjustment, fewer shutdowns for repairs.

- **2 to 4 times longer life**
- **Power savings up to 37%**
- **More accurate holding of gauge**
- **No more "hot necks" or "fire cracks"**

Westinghouse Micarta Bearings are made for every rolling operation from blooming to bar and billet mills. Micarta Bearings are helping to set new production records in continuous strip mill rougher and scale breaker roll stands, as well as in 3-high sheet mills. These and hundreds of other applications are giving *more tonnage*.

Mill records prove that long-life Micarta Bearings are giving more production with substantial savings in power, grease, and replacements. J-06320

Write for complete details to Westinghouse Electric & Manufacturing Co., East Pittsburgh, Pa., Dept. 7-N.

WESTINGHOUSE

Westinghouse Micarta

NITRALLOY STEELS

- - prolong the life of

WAR EQUIPMENT

The well known wear-resisting qualities of the extremely hard surfaces obtainable with Nitralloy Steels have made Nitralloy essential for parts for tanks, planes, ships, guns and other war equipment. We are in a position to furnish Nitralloy Steels hot rolled, heat-treated, annealed, turned or centerless ground.

COPPERWELD STEEL COMPANY WARREN, OHIO

ARISTOLOY STEELS

CARBON TOOL STEELS · ALLOY TOOL STEELS
AIRCRAFT QUALITY STEELS · STAINLESS STEELS
NITRALLOY STEELS · BEARING QUALITY STEELS

THAT'S all it takes—just a few seconds—to insure longer, quieter, more efficient operation for almost any high-speed rotating part. The secret lies in eliminating vibration, principal cause of wear and failure.

The balancing of these parts was once a tedious and costly procedure. Now it is done so quickly and economically that no manufacturer should penalize his product by permitting the presence of unbalance to shorten the life of vital parts.

Using the radio principle of amplification, Gisholt Balancing Machines locate and measure unbalance vibrations to a degree of accuracy that is almost unbelievable—within 25 millionths of an inch. Yet, these machines are simplicity itself to operate.

The subject of balancing is interestingly treated in an illustrated 32-page booklet. Your copy will be sent on request. Gisholt Machine Company, 1217 East Washington Ave., Madison, Wisconsin.

LOOK AHEAD—KEEP AHEAD—WITH GISHOLT IMPROVEMENTS

Dynetric Balancing Machines

GISHOLT

TURRET LATHES ★ AUTOMATIC LATHES ★ BALANCING MACHINES

ROUND AFTER ROUND

This tough coat can take it

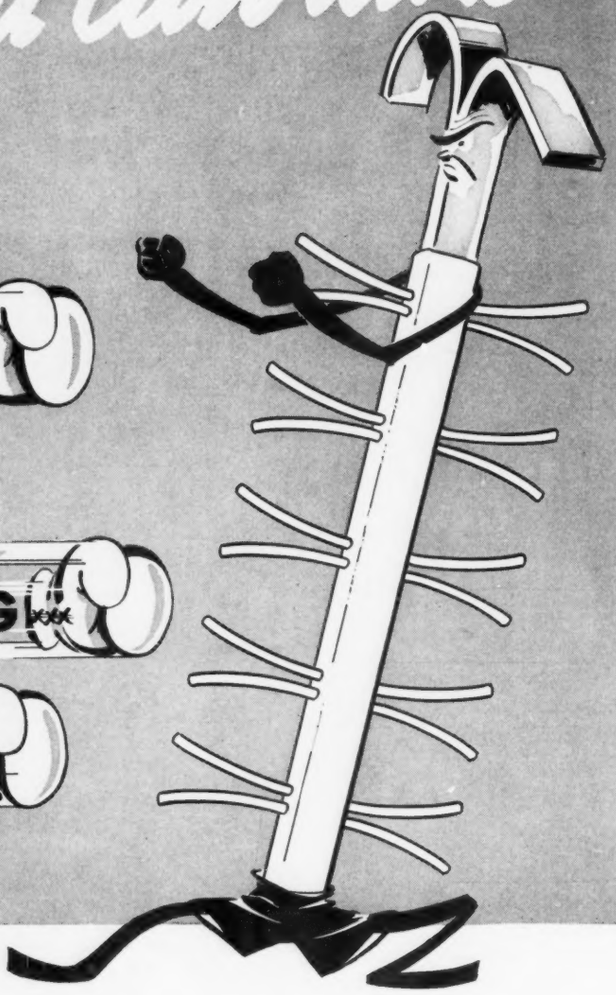
HOT CLEANERS

PLATING SOLUTION

ACID DIPS

FLEXING AND BENDING

ANODIZING BATHS



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Easily applied in your own shop! Saves time and material!

Right now, when platers and equipment are under pressure to produce to the limit of capacity—Unichrome "Air Dry" Rack Coating has proved the solution to two vital problems—longer rack life and lower maintenance costs.

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Remarkably resistant to wear and handling—yet it cuts cleanly and easily at the contacts. And out-of-service time is minimized because of the speed and ease with which Unichrome "Air Dry" Rack Coating is applied. Racks are dipped in the shipping container and dried in air at room temperature.

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SAFE—contains no ingredients harmful to solutions.

TOUGH—withstands wear and tear of handling.

FLEXIBLE—withstands repeated flexing and bending.

DURABLE—reduces the need for recoating.

CONVENIENT—any part can be patched without recoating the entire rack.

EASILY APPLIED—dipping can be done in the container in which it is shipped—drying, at room temperature.

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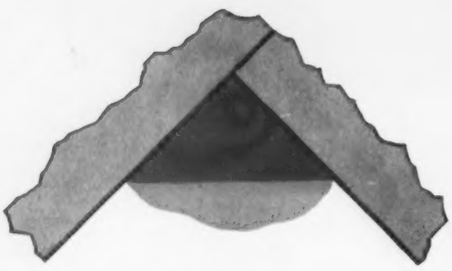
Are YOU Wasting

30 to 40% of your weld

ON VERTICAL FILLETS



WASTE

On vertical fillets, you may be wasting as much as 40 per cent of your weld metal as shown by the poor contour above. This may be due to one or more of the following conditions:

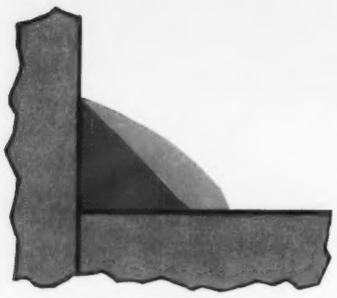
- ★ Arc length too short
- ★ Electrode too large
- ★ Low travel speed
- ★ Excess current, causing metal to run out
- ★ Wrong type of electrode for the job

GOOD PRACTICE

You can prevent this needless waste of electrode by putting into practice one or more of the following suggestions:

- ★ Use arc voltage recommended by the electrode manufacturer
- ★ Use smaller electrode, which, however, should be as large as plate thickness will stand but not larger than $\frac{5}{32}$- or $\frac{3}{16}$-inch in diameter
- ★ Speed electrode travel
- ★ Use lower current
- ★ Change to type of electrode better suited for this type of joint

ON HORIZONTAL



WASTE

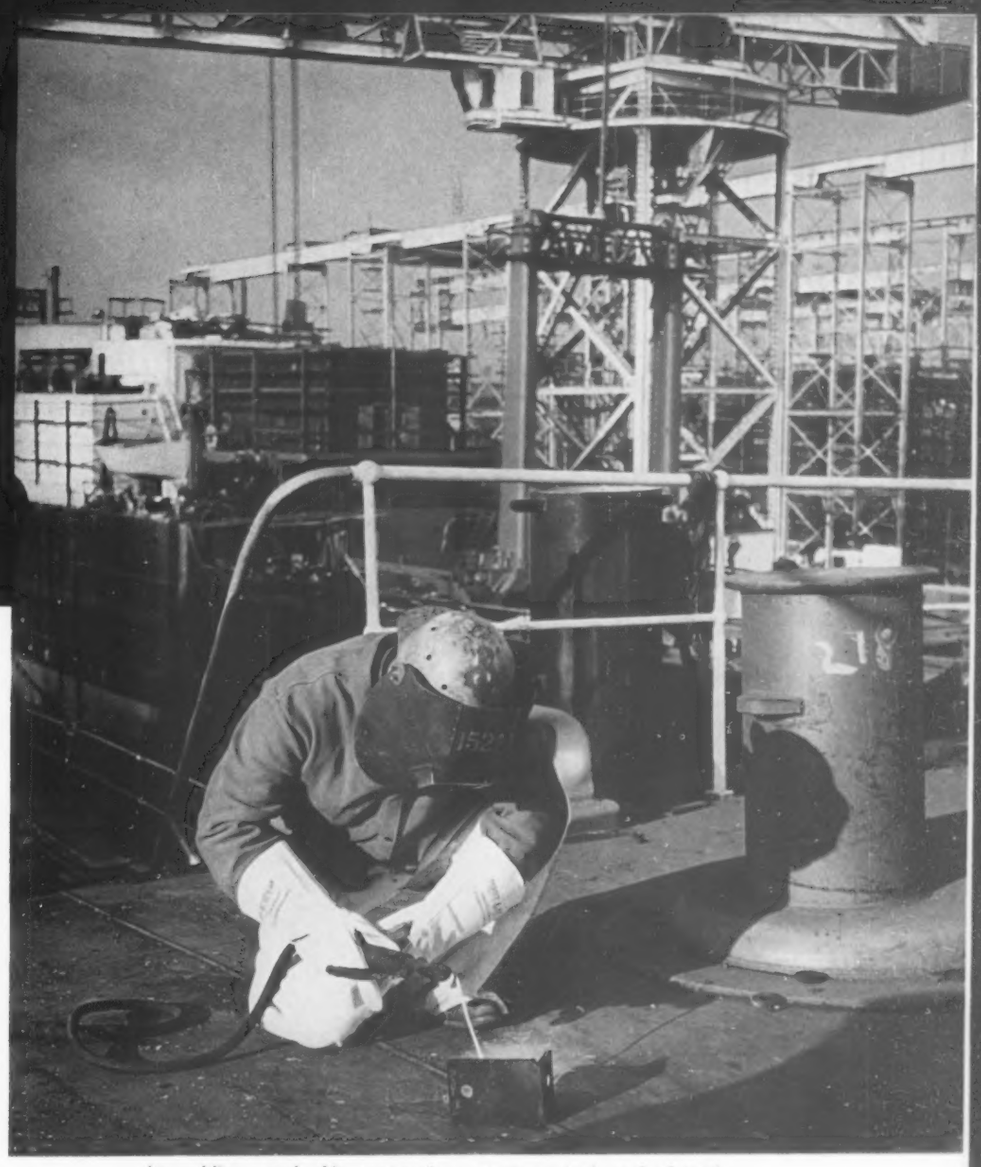
On horizontal fillets, you may be wasting as much as 30 per cent of your weld metal as shown by the poor contour above. This may be due to one or more of the following conditions:

- ★ Electrode held at wrong angle
- ★ Electrode too small for size of fillet
- ★ Excess current, causing metal to run down
- ★ Arc length too long—or too short
- ★ Low travel speed
- ★ Wrong type of electrode for this type of joint

Specialized Local Service to Help You

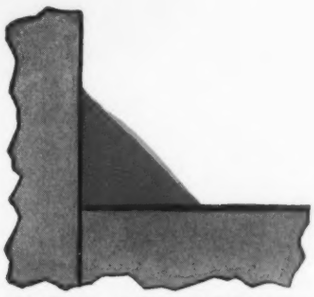
Whatever your particular arc-welding problems may be, our nearest G-E arc-welding distributor or G-E office can help you. G-E distributors have the most complete line of arc welding equipment on the market. Their knowledge and experience are thorough. Their recommendations are based only on what is best for your particular needs.

metal ?



Arc welding speeds ship construction, conserves steel, and, through reduction of dead weight, increases cargo capacity and cruising range.

FILLETS



GOOD PRACTICE

You can prevent this needless waste of electrode by putting into practice one or more of the following suggestions:

- ★ Hold electrode at angle recommended by the manufacturer
- ★ Use larger electrode, but not more than ¼-inch in diameter
- ★ Use less current
- ★ Use arc voltage recommended by the electrode manufacturer
- ★ Speed electrode travel
- ★ Change to type of electrode better suited for this type of joint

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Published by THE PENTON PUBLISHING CO., Penton Building, Cleveland, Ohio. E. L. SHANER, President and Treasurer; G. O. HAYS, Vice President; F. G. STEINEBACH, Secretary.

Member, Audit Bureau of Circulations; Associated Business Papers Inc., and National Publishers' Association.

Published every Monday. Subscription in the United States and possessions, Canada, Mexico, Cuba, Central and South America, one year $5; two years $10; all other countries, one year $12. Single copies (current issues) 25c.

Entered as second class matter at the postoffice at Cleveland, under the Act of March 3, 1879. Copyright 1942 by the Penton Publishing Co.

STEEL

ESTABLISHED 1882

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PRODUCTION • PROCESSING • DISTRIBUTION • USE

IT PAYS 5 WAYS

TO *Standardize* *on* EX-CELL-O THREAD GRINDERS

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2 CONSTRUCTION . . . Ex-Cell-O thread grinders are substantially, compactly built—to give years of service—with base, work table, controls, compartments, etc., all integral parts of a uniform exterior design. Moving parts are made for *precision* operation. Work table slides, for instance, are heavily ribbed and normalized to eliminate warpage. Hardened, ground and lapped steel rollers support work table on scraped ways. Anti-friction rollers are retained in steel carriers so that table moves with uniform freedom, preventing variation of table drag that would affect accuracy of work.

3 ADAPTABILITY . . . Within the designed capacity of each of nine Ex-Cell-O standard thread grinding machines—automatics, universals, and plain production—a wide range of work is possible. Users of Ex-Cell-O precision thread grinders are finding that on many work pieces more overall speed and economy are attained by precision grinding *all* threads called for, including even those not requiring the extreme accuracy of grinding.

4 WIDE VARIETY OF STYLES . . . Ex-Cell-O has developed precision thread grinding to cover the many requirements of American industry for precision threaded work. There are available nine different styles of Ex-Cell-O thread grinders—*all standard machines*—with greatest practical interchangeability in use of dressers and lead screw and nut assemblies.

5 MADE BY DEPENDABLE FIRM . . . Only one standard is acceptable at Ex-Cell-O—the greatest commercial accuracy it is possible to attain, whether it be in the designing of precision thread grinders or any of the various other precision machines and tools bearing the Ex-Cell-O name.

Above: *Ex-Cell-O Style 39-A . . . for precision grinding internally threaded work. One of nine styles of Ex-Cell-O standard thread grinders.*

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EX-CELL-O CORPORATION • DETROIT

HIGHLIGHTING THIS ISSUE OF STEEL

STEEL'S review of recent developments in the iron and steel industry of Europe reveals that the race to produce implements of war is at terrific tempo **(p. 34)**; it proves that Donald M. Nelson's call for all-out production here is a ringing challenge for all industry—no matter what the nature of its business has been in normal times. Manufacturers again and again are urged to use all their ingenuity in learning how they too can convert to war production. STEEL this week tells pictorially **(pp. 26-29)** how facilities formerly devoted to production of iron and steelworks equipment now are engaged on antiaircraft gun carriages; it tells how a spring and bumper manufacturer **(p. 30)** has gone into production of armor plate.

• • •

While industry still is far short of all-out production, progress in that direction is rapid. General Motors Corp. **(p. 32)** announces an important three-point program to help keep planes, guns and tanks at highest possible fighting efficiency. Production of four-engined bombers on a moving assembly line is a reality **(p. 31)**. A new spinning method has increased production of bombs **(p. 35)**. A new shipyard will turn out Liberty cargo vessels by assembly line technique **(p. 55)**. . . . On the other hand **(p. 43)**, governmental red tape has thrown the iron and steel expansion program several months behind schedule. . . . In the meantime, plate supply **(p. 109)** has caught up with most essential needs.

Spin Bomb Cases

• • •

WPB's priorities staff has been reorganized **(p. 37)**; additional civilian production will be curtailed; a press and shear builder may increase his prices; two billions will be expended for communications equipment. . . . Number of required reports under priority orders has been reduced **(p. 40)**; OPA no longer requires affirmations of compliance; discounts on bale ties have been reinstated; plumbing and heating equipment will be simplified. . . . Duties of WPB division heads have been clarified **(p. 41)**. . . . Railroads have broader priority assistance **(p. 42)**. . . . A scrap industry committee will function with OPA **(p. 125)**. . . . St. Louis blast furnace will be dismantled and reassembled in Mexico **(p. 125)**. . . . Low-grade Cuban nickel ores will be developed **(p. 54)**. . . . Steel mills are authorized to pay higher freight on scrap **(p. 36)**. . . . A portion of the lake iron ore fleet is moving northward, the earliest start in history **(p. 122)**.

Priority Reports Reduced

• • •

Conversion of an auto-body plant to production of wing sections and other aircraft parts by adapting double-acting crank presses to work formerly done on drop hammers is described **(p. 64)** by Herbert Chase. . . . Load-center power distribution **(p. 72)** is an important development as it saves important amounts of copper and other materials. . . . Use of dead burned magnesium oxide clinker **(p. 80)** for basic open-hearth and electric furnace bottoms minimizes repair and rebuild time, according to H. N. Barrett Jr. . . . Economical scrap breakers were built **(p. 63)** from old rotary pumps and welded structural sections to reduce long spiral-shaped cuttings to small pieces.

Auto Bodies To Aircraft Parts

• • •

Various substitutes for zinc coatings have been developed, many of which perform well according to information in a recent report **(p. 68)** issued by the American Iron and Steel Institute. . . . Exceptionally large and fast automatic machines using the Unionmelt welding process **(p. 86)** are doing important work in speeding our shipbuilding program. Much data on performance of this equipment is presented. . . . An improved packing method **(p. 94)** helps relieve the container shortage by conserving materials, points out Paul Gibson. . . . Fluid-drive clutches are welded oil-tight in a high production setup **(p. 62)** utilizing automatic shielded carbon-arc equipment.

Substitutes For Zinc Coatings

Whenever Steel is Needed..

In peace and war, in good times and bad—year-in year-out for a century—Ryerson stocks of steel have been American industry's prompt, dependable source of supply.

Today, war production requirements come first—but Ryerson is serving, too, the needs of other essential industries from which flow the goods that feed, clothe and house the nation,—that supply its power, its minerals and other raw materials—all part and parcel of the mighty war endeavor.

The two-fold Ryerson function is to supply steel where needed, without delay—and to aid in the most effective, intelligent use of that steel in every way that experience and skill can suggest.

Wartime demands have made inroads in Ryerson stocks, but Ryerson resources are at your command, to assist you in meeting any problem of steel supply or application.

Joseph T. Ryerson & Son, Inc., Chicago, Milwaukee, St. Louis, Cincinnati, Detroit, Cleveland, Buffalo, Boston, Philadelphia, Jersey City.

RYERSON

STEEL
March 23, 1942

NOW WE HAVE A CHEER LEADER.

A careful perusal of the speeches Donald M. Nelson has made in connection with his energetic drive for more production now shows that he knows the average American citizen better than most of the supposedly astute politicians in Washington.

Apparently Mr. Nelson has enough imagination to realize that he can increase production by a substantial percentage if he can arouse the proper spirit throughout the nation. Therefore, he is bending every effort to promote teamwork, to inspire rivalry in achievement and to lift morale to the highest possible plane.

He has made remarkable progress in this direction. In less than two months he has whipped up an enthusiasm for production which now is growing by leaps and bounds daily. He is proving to be the cheer leader which the nation needs.

This cheer leadership business is vitally important. It is so important that every man identified in any way with industry should support Mr. Nelson to the hilt in his one-man campaign to re-create the fighting American spirit on the home front.

Such support should be prompted by common sense and simple patriotism. But it also can be justified on the sordid basis of selfish interest. The spirit which Nelson is trying so hard to instill throughout the nation is the one thing that can save the institutions we cherish most highly. It is the one thing which will clear the path for the reforms that are necessary for the preservation of private industry and free labor.

Some business men are dubious about the Nelson joint shop committees, about the administration's pro-labor labor policy, and about unlimited nonessential government spending. All of the dire threats which these activities suggest will dissolve into thin air before the might of the spirit for unity in war which Mr. Nelson is trying to develop.

No OCD foolishness, no double time for Sundays, no restrictive labor legislation of any kind, no unnecessary government expenditures, no government persecution of any class can persist in the face of an American public which is fired by the spirit of determination to win.

If this nation ever was furnished a fortuitous inspiration, it is that which beckons now. MacArthur on the battle front; Nelson on the production line!

We cannot let them down.

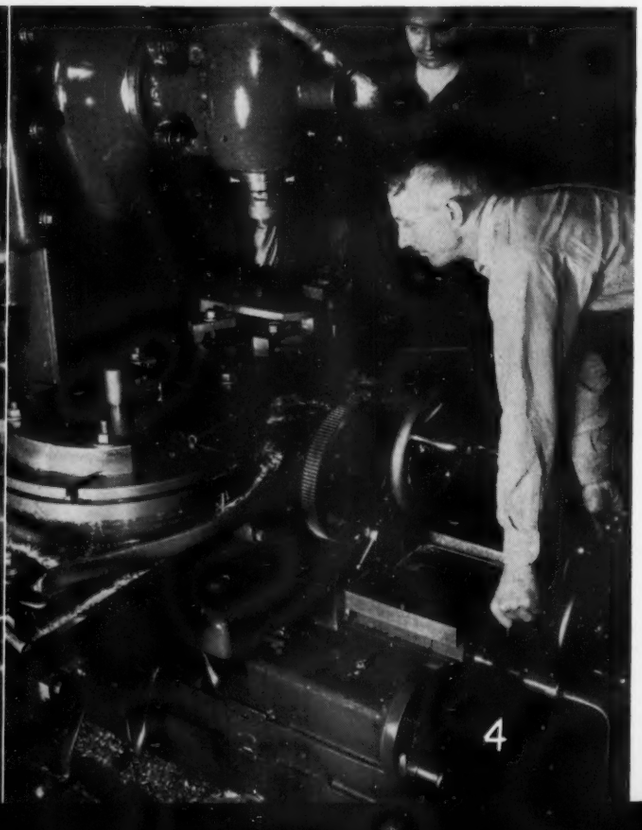
E. L. Shaner
Editor-in-Chief

EQUIPMENT BUILDER Converts Plant TO MANUFACTURE GUNS

★

Any manufacturer who can benefit by having additional information about this conversion job, or who feels he is in a position to make the conversion even more efficient and effective, can secure the necessary details from the nearest Ordnance District Office.

THE EDITORS



NOT many months ago steelworks equipment was coming out of the finishing end of a plant nestled in the hills of Pennsylvania; today 37-millimeter antiaircraft guns are wheeled out the same doors and dispatched on their way to coastal or other points to spit bullets into axis planes and knock them from the skies.

The changeover from peacetime to wartime production was effected in a minimum of time. Machine tools long used for putting the finishing touches on heavy equipment for making finished steel were moved from one position to another and new units purchased to round out shop facilities. Cranes began to rumble overhead, and soon workmen were tooling iron and steel parts for the 37-millimeter antiaircraft gun and assembling them into complete units.

Many of the steps involved in the machining, inspecting, and assembling of the gun are presented herewith. All photographs from the Office of Emergency Management, by Hollem.

★

1. This master machinist lays out precision parts that go to make up a 37-millimeter antiaircraft gun carriage. Work of this kind demands a certain "tool room technique"

2. Milling operation on main frame of 37-millimeter antiaircraft gun carriage. Job demonstrates the importance of such "critical machine tools," as large horizontal boring, drilling and milling machines

3. Ball and socket type leveling mounting for a 37-millimeter antiaircraft gun carriage is machined in Bullard vertical turret lathe. Leveling assembly permits gun to be kept on an even keel on all types of terrain

4. In this particular milling operation a steel axle bracket mounted in swinging fixture is being slotted on an arc of predetermined radius by a high-speed end mill in a Milwaukee milling machine

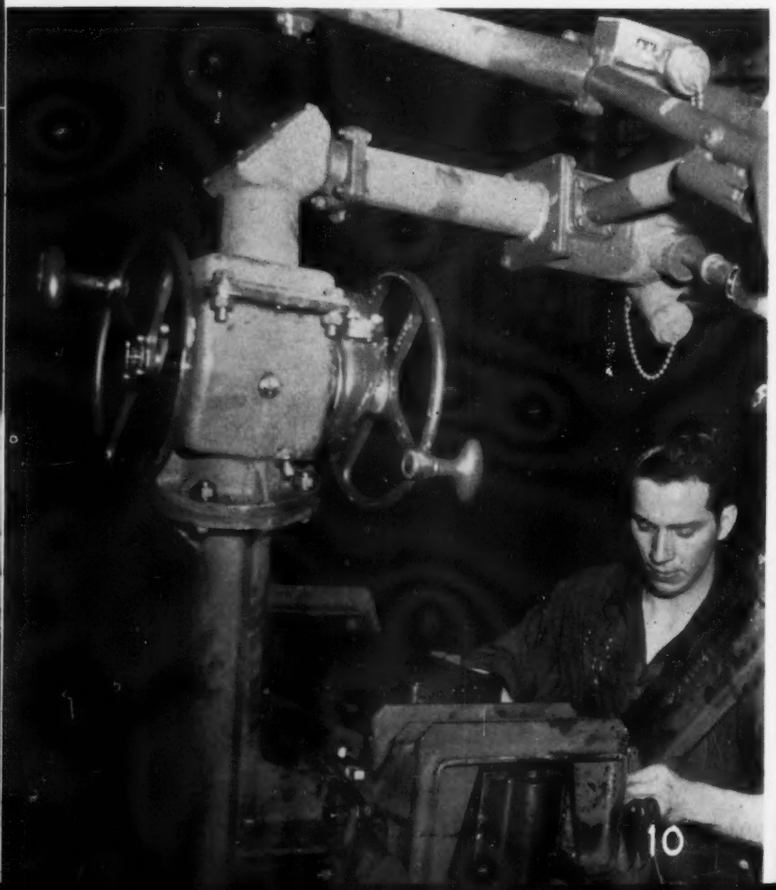
5. Hold-down clamp used in assembly of 37-millimeter antiaircraft gun carriage involves face machining to predetermined radius. This is accomplished in a standard lathe by a special support for cross-slide tool rest. To enable quick loading and unloading of work a special face plate fixture has been designed

6. An important part in speedy and accurate control of 37-millimeter antiaircraft gun is the traversing mechanism which must be heavy and manufactured to withstand shock of travel over rough terrain and rapid firing of gun. Typical of parts which make up this assembly is the steel casting shown herewith in process of being machined in a Giddings & Lewis horizontal boring, drilling and milling machine

7. Leveling yoke of 37-millimeter antiaircraft gun mount is an excellent example of what can be accomplished through use of various materials and modern welding practice. In addition to demanding minimum weight with maximum strength, the important detail has a number of precision machined surfaces including trunnion bearings and the central cup. Precision jigs hold machining allowances to a minimum, thereby conserving valuable machine tool time. This illustration shows the cleaning of this leveling yoke following machining and just prior to painting

8. Assembly without hand fittings demands that parts be made exactly to specification before reaching assembly floor. This insures, in the case of parts for 37-millimeter gun mount close limits on shop drawings and 100 per cent inspection of parts before they leave the shop for assembly department. In order to follow the course of planes flying 300 miles an hour, this massive mechanism must function literally at the flip of a finger. This can be accomplished by having delicate balance and perfect fits between many details of the complete assembly

9. This close-up of 37-millimeter antiaircraft gun mount shows final adjustment of quick-acting elevating mechanism which in conjunction with the swiveling mechanism enables the gunners to follow a fast-flying plane. Frame above and to left of assembler is main support of gun barrel and recoil mechanism. Some idea of the number of parts involved in gun proper can be deducted from portion of the lock and loading apparatus immediately in front of workman's head

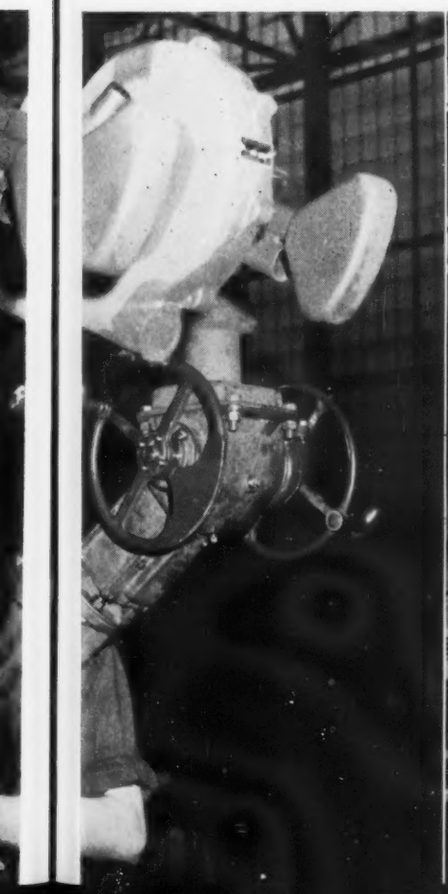


verts Plant to Manufacture Guns

10. Like a modern machine tool, the 37-millimeter antiaircraft gun mount has been "tailored to fit." Aiming and control are co-ordinated in such a way that by turning cranks mechanically connected to the elevating and swiveling mechanism, the gun can be made to follow its rapidly moving target. This is an illustration of control mechanism as seen from seat of man operating swiveling mechanism. His companion positioned at his right operates a similar control for elevating gun. Note that maximum rigidity has been combined with a minimum of weight throughout entire mechanism by use of scientifically designed ribbed construction

11. View of assembly department looking from front to rear and showing progressive growth of 37-millimeter antiaircraft gun mount from bare frame to finished product. This illustration gives a particularly clear conception of the manner in which plates, shapes, tubes, forgings and castings have been combined to form a strong, rigid and light foundation for the gun. Special handling devices expedite assembly. Incidentally, more than 200 subcontractors are contributing toward complete unit

12. Final adjustments are being made to this completed 37-millimeter mobile antiaircraft gun. Gun is shown in a traveling position with wheels set for towing over roads. However, outrigger at left has been swung up as it would be if wheels were retracted to set chassis down on the ground. Mechanic at right is seen giving a running test to elevating mechanism, gun being shown at almost maximum elevation



Spring Manufacturer Awarded $306,000,000 in Armor Plate Orders

◆

Pittsburgh district company accepts "parent" responsibility for subcontracting to 15 former competitors . . . Short cuts discovered

◆

IN A PITTSBURGH suburb a small company has been making auto springs and bumpers for 29 years. Now this company is going to make armor plate for tanks, and make it in relatively staggering quantities.

The largest production month the concern ever had in its two plants was $600,000 worth of springs and bumpers. This will be multiplied by about 50, for orders are now placed for $306,000,000 worth of armor plate and the company will take the "parent" responsibility on subcontracting to produce all the armor plate needed for M-4 and T-7 tanks.

Fifteen other spring and bumper companies, formerly competitors, have "pitched in" to help.

Executives of the "parent" company started a year ago to find out what war work could be done in their plants. Engineers studied thousands of war articles—shells, shot, plane parts, cannon, tanks, They visited other plants. They conferred with government procurement officials and Army and Navy officers. They picked armor plate as best suited to the largest percentage of their machines and skilled manpower.

Within 60 days this company will start turning out plate. It expects to reach a capacity equal to its peacetime peak by late June, and to double that by Nov. 1. Principal step in the processing of this armor plate is heat treatment. Similar procedure was followed to make springs and bumpers. The company had the furnaces and heat treatment experts. Some available presses could be used to straighten the armor after hardening.

But engineers hit a snag. The Army required planed and machined edges for close tolerances so that when assembled on a tank the steel plates would fit perfectly. The plants lacked both machines and trained men to do it.

"Why do those pieces have to fit so closely?" asked the engineers. "We could grind the edges instead of planing them, and weld the pieces together on the tank." This would be quicker work and make the tank stronger, the engineers contended, and they had the machines and men to do it. The War Department approved the change. That solved one problem.

WPB Provided Equipment

They had no flame equipment to cut the plates to size. The WPB said it would get this equipment and lease it to the company.

Some drill presses were available to bore holes in the plates but there were not enough. The WPB provided radial drill presses, as well as cranes to move the heavy plate. Also needed was shotblasting for cleaning the plate.

The Pittsburgh company had been supplying springs and bumpers to one auto corporation for 25 years. The corporation, with a large contract for tanks, needed armor plate. Large companies like to do business with suppliers that have proved their worth; so in a few days, a contract was signed.

"Give us 1000 sets a month—1500—maybe 2500," said the corporation. The program grew to almost fantastic proportions.

Another large corporation had taken a contract to make tanks. It, too, had bought peacetime products from the spring and bumper concern, and it, too, called for armor plate—lots of it. That presented a new problem.

Executives of the spring company were called to Washington by an official of the Facilities Section of the Tank and Combat Vehicle Division of Army Ordnance. The War Department asked a lot of questions—"Couldn't other spring and bumper companies make tank armor plate?"—"How much armor plate could this branch of the auto industry turn out?"—"Would the concern become the 'parent' subcontractor and find adequate sources to provide the huge quantity of armor?"

The Washington conference was on a Saturday. On Sunday, letters went out to the other bumper makers, asking them to send representatives to a meeting in Toledo the following Wednesday.

They were all there, with engineers, production men and executives. The Army outlined the program of converting the entire spring and bumper industry.

The Pittsburgh company gave its one-time competitors a detailed resume of its year-long investigation of armor plate, together with blueprints, plans, manufacturing methods and results of tests.

Operations Divided

A second meeting was held within a week. More spring-making firms came in. So did a farm equipment manufacturer, and a plant that turns out interior hardware for autos. The companies took the blueprints and detailed plans and adopted the "parent" concern's methods. Two weeks later, 15 companies were allotted orders for a total of $25,000,000 worth of plate a month.

Some of the companies make only certain pieces of the armor plate. The general plan follows auto production methods, combined with precision manufacturing. "Plant A" gets the steel from the mills, flame cuts the plate to size and ships the pieces to other companies. These plants heat treat, straighten, sand blast, drill, grind and machine (some of the plants do only some of these operations), then ship the plate back to "Plant A," where it is painted, stenciled, assembled into sets, and shipped back to the tank plants.

The "parent" concern has moved out old machinery and moved in new. Many of its 700 employes at the two plants stayed on the job to help set up the new plant. The management expects all of the men back soon—and many more, to be trained.

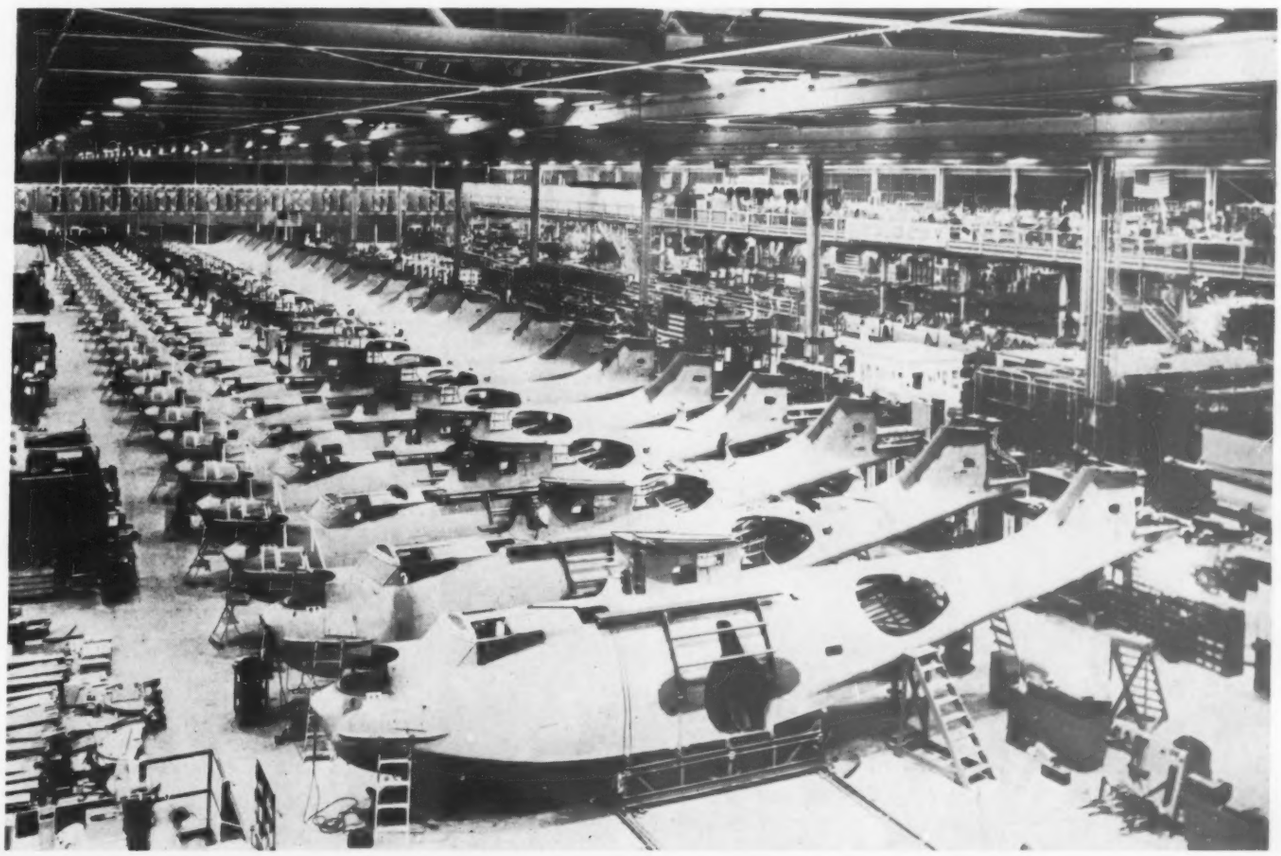
Here They Come! "Eyes" and Bombers in Mass Production

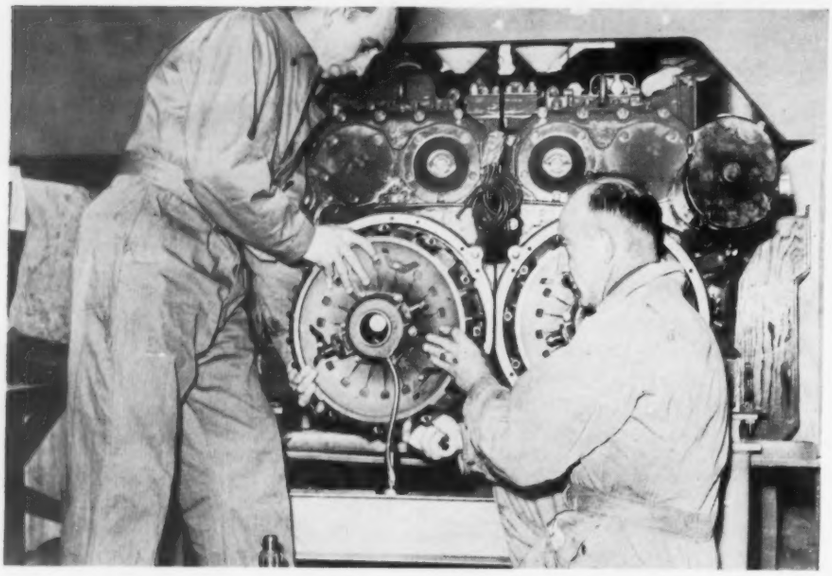
OUTSTANDING industrial pictures of the week, these two photos taken in Consolidated Aircraft Corp.'s San Diego, Calif., plant, give evidence of the progress being made in mass production of aircraft for the fighting forces.

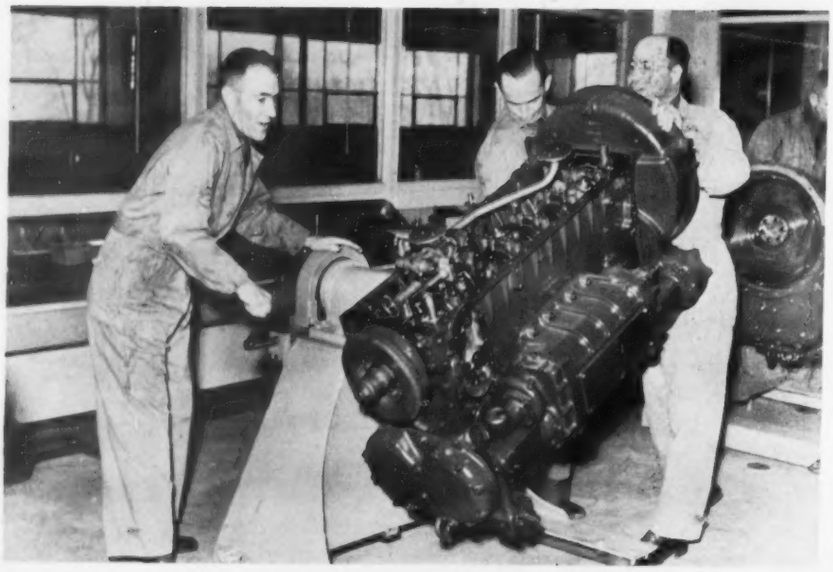
BELOW, mechanized assembly line for two-motored flying boats. These PBYs—called Catalinas by the British flyers—are in service in considerable numbers as "eyes" for the United Nations' fleets. The flying boats weigh 15 tons, have a speed of more than 200 miles an hour, range of more than 4000 miles.

ABOVE, heavy four-engined bombers on a moving assembly line.

NEA photos, passed by censor.







Arms Maintenance Program Offered Army, Navy by GM

GENERAL Motors Corp., Detroit, has announced a three-point program to help keep the planes and tanks and guns of the United Nations at highest possible fighting efficiency. (See Mirrors of Motordom, STEEL, March 9, p. 47). As disclosed last week by C. L. McCuen, vice president in charge of engineering, General Motors has advised the Army and Navy that it will:

1. Help train the enormous number of mechanics required to keep a modern task force in motion by maintaining schools for Army and Navy instructors.
2. Place its own engineers in the field to expedite reports on operating experience so that its war products can be improved constantly.
3. Assist the Army and Navy in having replacement parts on the spot when needed.

The training job alone calls for expenditures totaling not less than $5,000,000 for the current year. It will mean training thousands of instructors in scores of centers throughout the country.

Special staffs have been set up under Mr. McCuen to co-operate with the corporation's manufacturing divisions in promoting each of these three activities. John E. Johnson, former sales manager, General Motors of Canada Ltd., has been appointed director of the Department of Training Service; W. J.

◆

(Photos, Top to Bottom)

TWO members of instructor training school for Army men at General Motors Institute, Flint, Mich., disassembling clutch of diesel tank engines. Note twin engines with accessories mounted on outersides

◆

PROSPECTIVE instructors learn how to "flip" a diesel tank engine to inspect connecting rods, crankshaft and oil pump. The school is graduating 25 instructors a month for the armored force training center at Fort Knox, Ky.

◆

C. E. WILSON (left), president, General Motors Corp., Maj.-Gen. Jacob L. Devers, chief of armored forces, and O. E. Hunt, vice president of GM, discuss new three-point war maintenance program launched by the corporation

Davidson, a General Motors engineer of wide experience, will have charge of the Engineering Service Group, while M. D. Douglas, Chevrolet parts and accessories manager, will handle parts distribution.

Present plans call for the department of training service to assist in or operate schools for ten GM designed products and a similar number designed outside of General Motors. In the former category are trucks, diesel engines, tanks, Allison aircraft engines and propellers. In the latter are air-cooled engines, guns of various sizes, planes and torpedoes.

In addition to training officers and enlisted men as instructors for service at camps and bases and in the field, General Motors also has taken on the job of developing technical information for the Army and Navy and material for Army and Navy manuals and instruction books.

Divisional heads have been warned of the urgency of the program and have been advised that schools should get under way at least 90 days before volume deliveries of any product reach the field. In the case of divisions making certain types of products—cartridge cases, for example—training schools are not needed. Other divisions, however, may have to organize schools even though they hold no direct war contract because of the importance of the parts subcontracted to them. This is true in the case of diesel engines for tanks.

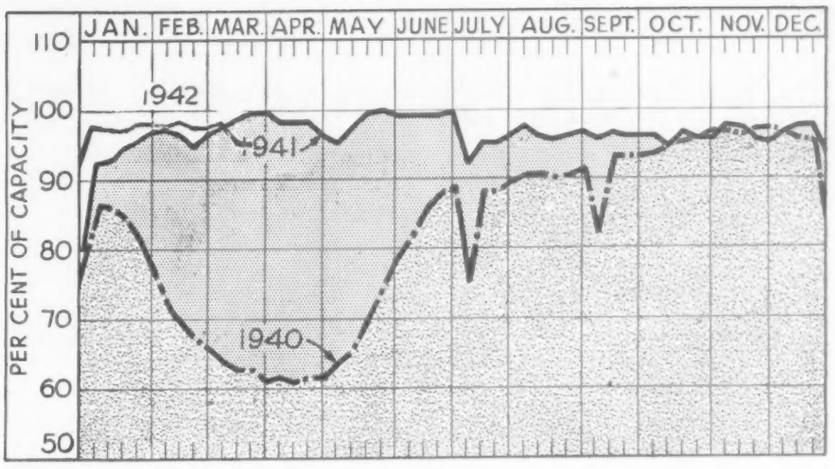
Known as Four Echelon System

The General Motors Institute at Flint, Mich., has set up facilities for training men to staff divisional schools. If the divisions have no men with teaching experience available, they are advised to send experienced men to Flint for basic instruction in teaching.

The training program follows the design, standards and regulations set up for the armed forces and known as the Four Echelon System.

Under this system the enlisted personnel of the armed forces are trained for four different types of maintenance work. In the first echelon are the men who operate the equipment in the field. In the second echelon are field mechanics working from light repair units. The third echelon includes men in semimobile shop units where major repairs and replacements are made, while the fourth echelon covers the permanent overhaul depots.

General Motors also has launched a co-operative program with the armored force training center at Fort Knox, Ky., training 25 men per month as diesel engine instructors. This school has been set up at the General Motors Institute, and the first class was graduated recently.



PRODUCTION . . . . Steady

PRODUCTION of openhearth, bessemer and electric furnace ingots last week remained steady at 95½ per cent. Four districts advanced, three declined and five were unchanged. A year ago the rate was 99½ per cent; two years ago it was 62½ per cent, both rates being computed on capacity as of those dates.

Youngstown, O.—Rose 1 point to 95 per cent, with 75 open hearths and three bessemers in production. A drop of 1 point is scheduled this week with Republic Steel Corp. taking off one open hearth at Warren, O., because of scrap shortage.

St. Louis—Receded ½-point to 83 per cent as one interest took off a large open hearth for repair and another added two small furnaces as scrap supply increased.

Chicago—Advanced 1 point to 104 per cent, ½-point below the December peak. Scrap supply is barely sufficient for this rate. Three companies increased activity, two held even and one dropped several points.

Cleveland—Unchanged at 91 per cent.

Birmingham, Ala.—With 23 open hearths in production the rate remained at 95 per cent for the sixth week.

Central eastern seaboard—Steady at 88 per cent, scrap supply preventing a higher level.

Detroit—Declined 4 points to 83 per cent because of scrap shortage. Ford Motor Co. steel plant is operating only about two-thirds capacity.

Cincinnati—Resumption by a producer after being shut down for repairs increased production 7 points to 87 per cent.

Buffalo—Lacking scrap for idle furnaces the rate remained steady at 79½ per cent.

New England — With all open hearths melting the rate attained 100 per cent, up 5 points.

Pittsburgh — Open-hearth repairs caused a drop of 1 point to 94 per cent.

Wheeling—Held its rate steady at 81½ per cent.

District Steel Rates

Percentage of Ingot Capacity Engaged In Leading Districts

	Week ended Mar. 21	Change	Same week 1941	Same week 1940
Pittsburgh	94	− 1	101.5	57.5
Chicago	104	+ 1	101.5	59.5
Eastern Pa.	88	None	96	60
Youngstown	95	+ 1	97	43
Wheeling	81.5	None	88	73
Cleveland	91	None	98	74
Buffalo	79.5	None	93	51
Birmingham	95	None	90	78
New England	100	+ 5	100	65
Cincinnati	87	+ 7	93.5	51
St. Louis	83	− 0.5	99	58
Detroit	83	− 4	89	78
Average	95.5	None	*99.5	*62.5

*Computed on steelmaking capacity as of these dates.

Tennessee Coal & Iron Orders 73 Koppers Ovens

Tennessee Coal, Iron & Railroad Co., Birmingham, Ala., subsidiary of U. S. Steel Corp., last week awarded a contract to Koppers Co. for 73 Koppers-Becker coke ovens at Fairfield, Ala., according to Joseph Becker, vice president, Koppers Co.

The contract includes auxiliary equipment to process gas from these ovens. This order will raise the total of Koppers and Koppers-Becker ovens at Fairfield to 509. Construction will begin at once.

Materials Shortages Hamper Production In Occupied Countries

England tightens controls over metals output following defeats in Far East . . . Russia regaining part of industrial capacity

By J. A. HORTON
British Correspondent, STEEL

BIRMINGHAM, ENGLAND

AMONG the many important developments in the war situation in the last three months none has more significance than the Russian comeback. The enemy, which at one stage was knocking at the very gates of Moscow, has not only been checked but driven back all along the enormous front, despite the hampering effects of the Russian winter.

The effect on industry in the Soviet Union must be of considerable proportions, and although the "scorched earth" policy put out of action industrial capacity in many towns, the freeing of these towns from the invader will be followed as soon as practicable by a return to production, while of course, there is the fact that industrial areas which were menaced a few months ago can continue unmolested in their work of supplying the needs of the Russian fighting services.

The advancing armies are also capturing large quantities of ammunition and equipment from the retreating Germans, though how serviceable these may be is difficult to say.

One thing is certain; Hitler will make a desperate effort to check the Russian armies in the spring.

Reports from Germany received by the British Ministry of Economic Warfare indicate that a tremendous production drive is in progress, probably presaging a large-scale offensive. Recent changes in the German civil constitution have been undertaken in order to increase production to the maximum and reduce civilian consumption to a minimum. A minister of rationalization has been appointed. The Germans are closing down textile factories in order to turn over workers to war production. A corresponding drive to increase the labor force is in progress, and German newspapers are forecasting the conscription of foreign workers in occupied countries. Factory work is tending more and more to be staggered owing to the shortage of electrical power. Thirty German propaganda fairs which were to have been held all over Europe this year have been canceled.

In the occupied zones of Europe Germany is doing all she can to keep up production but reports reaching London through reliable sources show that considerable difficulties are being met.

Hit By Coke Scarcity

In Belgium for instance, severe rationing of domestic coal has been necessary; gas is limited in supply and poor in quality. Furnaces have had to be damped down, factories put on short time, and metal works are periodically stopped by turns for lack of coke, several closing altogether. There is no doubt also that the bombardment by British airmen has interfered with production and indeed has put some works out of action altogether, while others will take months to repair. In Luxembourg, Spanish labor has been introduced to help on the production effort.

Recent reports from France show the effect of the war upon the iron and steel works. At the annual meeting of one of the big companies it was reported that only a few of the plants—and these mainly in the unoccupied zone are able to work more or less normally. Yet these plants had record outputs during 1939 and in the first half of 1940. Some French blast furnaces in the East had to be blown out recently owing to shortage of coke.

An increasing shortage of raw materials is affecting the iron and steel position in Holland. Output is falling and the Nazi labor front chiefs are appealing for aid to put a stop to the deterioration. In shipyards in Holland and North Germany there are vessels on the ways upon which work has been suspended because necessary materials are not available. The Nazi attempt to make good the deficiency by appealing for voluntary surrender of metal articles has apparently failed.

It is extremely difficult to discover exactly what is happening in Germany itself with regard to metals, but there are good grounds for believing that the war has curtailed Germany's supplies of many of the important alloying metals used in making special steels, which themselves are so vital in the manufacture of munitions of war. She has had to evolve substitutes, and among other discoveries, a German investigator claims that hydrogen can be used as an alloying element, under certain circumstances, giving the same results as a percentage of manganese and chromium.

Swedish Works Busy

The Swedish iron and steel works continue to work at capacity but some fuel shortage has been experienced recently and this may result in lower output during the next few months. Materials for shipbuilding are in great demand, and the engineering industries are buying at a high rate. The difficulties of obtaining raw materials are still great, particularly in regard to certain metals and alloys.

Britain's reverses in the last few weeks will lead inevitably to intensification of the war effort. Steel capacity is likely to be taxed to the utmost and steps are being taken to see that the needs of the services in armaments and munitions are supplied.

Iron and steel manufacturers have been successful to a great degree in keeping pace with the ever-growing needs of the war machine. Careful husbanding of resources has been directed by the Iron and Steel Control to prevent the indiscriminate use of high-grade steel alloys and also of hematite iron where another grade can be found suitable. In all districts of England and Wales the demand has been greatest for special steels and alloys used in the armament and munitions factories. Pressure is also heavy for steel plates

(*Please turn to Page* 124)

REVISIONS AND ADDITIONS TO

PRIORITIES—ALLOCATIONS—PRICES

as published in Section Two of STEEL, Feb. 23, 1942

"M" ORDERS

M-63 (Amendment): **Imports of Strategic Materials,** effective March 14, 1942. Removes restrictions on imports of cadmium, zinc ores and concentrates, lead ores and concentrates and copper ores and concentrates.

M-80: Sole Leather, effective March 12, 1942. Provides that 80 per cent of top grade leather soles be set aside for military shoes.

M-81 (Interpretation): **Tin Plate and Terne Plate,** issued March 13, 1942. Permits canners to buy and use quantities of tin plate required to fill government orders.

M-93: Wood Pulp, effective March 12, 1942. Places entire wood pulp industry under allocation system, effective May 1, 1942.

M-95: Rhodium, effective March 11, 1942. Prohibits use in plating of jewelry. Present stocks of jewelers may be consumed but not replenished. Sellers of rhodium salts or solutions must report to WPB on PD-295. Consumers report on PD-296, listing stocks.

"P" ORDERS

P-19-e (Amendment): **Road Projects,** effective March 6, 1942. Eliminates extension of preference ratings granted a road project to the purchase of road building machinery and equipment. May be used to expedite delivery of repair parts to prevent stoppage of work.

P-84: Plumbing, Heating Repairs, effective March 13, 1942. Assigns A-10 rating to materials for emergency repairs. Does not apply to copper parts or scarce materials for which substitutes available.

P-88: Railroad Material, effective March 17, 1942. Assigns A-1-a rating for materials needed for emergency repairs upon specific approval of WPB; an A-3 rating for materials essential for track, structure, signal and train and locomotive repair and operation, including perishable tools; an A-8 rating on all other maintenance repair and operating supplies. Use of A-3 and A-8 ratings is controlled by quarterly inventory statements submitted to WPB on form PD-352. Ratings for raw materials and quantities thereof also determined by WPB on quarterly basis.

P-90 (Amendment): **Production Requirements Plan,** effective March 10, 1942. Permits companies using plan to use ratings assigned by other certificates to obtain material not regularly carried in stock.

P-98 (Amended): **Petroleum Industry Materials,** effective March 15, 1942. Includes office supplies and certain automotive equipment among items to which preference ratings may be extended.

P-109 (Amendment): **Aircraft Products,** effective March 11, 1942. Abolishes the distinction between material to be physically incorporated into aircraft products and other necessary material used to build military and naval aircraft. Applies to tactical types of aircraft.

P-109-a: Aircraft Products, effective March 11, 1942. Assigns A-1-b rating to production of trainer types of military and naval aircraft. Otherwise similar to P-109 as amended.

For additional revisions and additions please see STEEL of March 2, p. 39, March 9, p. 38, and March 16, p. 39.

"L" ORDERS

L-6-c: Domestic Laundry Equipment, issued March 14, 1942. Companies which produced more than 60,000 units in the year ended June 30, 1941, must cease production April 15, 1942. Others must cease production May 15. Meanwhile, production permitted at 1½ times the February quotas set under L-6-a.

L-21-a: Automatic Phonographs; Weighing, Amusement and Gaming Machines, issued March 16, 1942. Production after April 30, 1942, prohibited. Between March 1 and April 30 production permitted three times the February quotas. Effective immediately, fabrication of copper, copper alloy and stainless steel prohibited. Production of repair parts for slot machines banned.

L-27-a: Vending Machines, issued March 17, 1942. Manufacture prohibited after April 30, 1942. Does not affect manufacturer of repair parts if limited to rate of output during year ended June

L-32: Metallic License Plates, effective March 18, 1942. Prohibits state and local governments from issuing plates in one year in quantity more than 10% of weight of plates issued in corresponding year ended between June 30, 1941 and July 1, 1942, and then only to replace destroyed or lost plates, for new licensees or for "date tabs" not more than 4 square inches in size.

L-42 (Addition): **Plumbing and Heating Products,** effective April 1, 1942. Schedule IV directs discontinuance of manufacture of medium soil pipe; reduction in weight of extra heavy soil pipe, elimination of use of brass pipe plugs and brass-trap screws with soil pipe fittings.
30, 1941.

L-52: Bicycles and Parts, effective March 12, 1942. Until March 31, production limited to 42 per cent of number of bicycles built in corresponding 1941 period. No bicycles may weigh more than 45 pounds. Production of juvenile models prohibited after April 1. No models after April 1 may weigh more than 31 pounds. Output April 1 to June 30 limited to 42 per cent of 1941 average monthly rate. Metals used in manufacture generally limited to iron, unalloyed steel, silver and gold.

L-54-b: Office Machinery, effective March 15, 1942. Halts, purchase, sale and rental of new machinery except to persons with preference rating of A-9 or higher issued on PD-1A or PD-3A certificates.

L-56: Fuel Oil Consumption, effective March 14, 1942. Forbids fuel oil delivery in 17 eastern states, District of Columbia, Oregon and Washington, for use in new equipment unless installation completed within 30 days, or in converted facilities unless conversion completed within ten days. Permitted for new structures if foundations completed within 30 days and oil-burning equipment originally specified.

L-69: Bright Work on Vehicles, effective March 14, 1942. Prohibits use of bright work on all types of motor vehicles and trailers, including replacement parts and accessories other than ventilator window latches, external locks, cylinder caps and covers, windshield wipers and body trim screws.

L-70: Motor Fuel, effective March 19, 1942. Curtails by 20% gasoline deliveries to service stations and bulk consumers in 17 eastern states, District of Columbia, Washington and Oregon. Service station operations in curtailment areas limited to 12 hours daily, 72 hours a week.

PRICE SCHEDULES

No. 20 Amendment—Copper and Copper Alloy Scrap, effective as of Feb. 7, 1942. Excepts from the price schedule railroad scrap reprocessed under conversion agreements approved by WPB.

No. 41 Amendment—Steel Castings, effective March 16, 1942. Permits producers of railroad specialty castings to charge for certain extras, coupler repair parts and pattern costs customarily charged between Oct. 1 and 15, 1941.

No. 67 Amendment—Machine Tools, effective March 13, 1942. Permits Niagara Machine & Tool Works, Buffalo, to exceed its Oct. 1, 1941, list prices for three machine tools it manufactures.

No. 98 Amendment—Titanium, effective as of March 1, 1942. Permits American Zirconium Corp., Baltimore, to exceed maximum prices by 1½ cents per pound until May 2, 1942.

Bomb Production Accelerated by Spinning Process

BOMB production by a new spinning method, described as "revolutionary in character" has reached a point of efficiency where the process can be utilized for turning out increasing quantities of this vital war weapon. This announcement was made last week by B. F. Harris, president, National Tube Co., United States Steel Corp. subsidiary, which developed and perfected the process.

(For illustrations relating to the process, see photos on page 57, released in connection with U. S. Steel's annual report last week.)

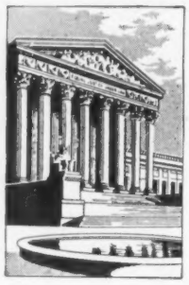
Process is being utilized by the Army Ordnance Department which will have installed similar machines in plants of other manufacturers, and the National Tube Co. is lending its aid in educating these potential producers.

Bomb production by the spinning method developed by the com-

(*Please turn to Page* 126)

Windows of *WASHINGTON*

Steel mills to pay new 6 per cent freight surcharge . . . President says mobilization of workers not yet in sight . . . Stricter limitation imposed on use of tin . . . Issuance of metal license plates banned . . . Program for controlling soft coal prices established . . . . War communications equipment production expected to reach $125,000,000 monthly . . . Higher prices permitted for three types of machine tools . . . Civilian goods output curtailed further



By L. M. LAMM
Washington Editor, STEEL

WASHINGTON

STEEL mills may pay the new 6 per cent transportation surcharge, which became effective March 18, OPA ruled last week in Amendment No. 1 to Revised Price Schedule No. 4, iron and steel scrap. This emergency charge, which is effective for the duration of the war and to a period six months thereafter, does not represent a change in the basic rate structure.

OPA quarters explained that there will be no change in computing the shipping point price, but the additional freight charge may be added on to the price the consumer pays.

Illustrating this, OPA explained that the basing point price at Chicago for No. 1 heavy melting scrap continues at $18.75 per gross ton. The old switching charge was 84 cents per gross ton. The shipper, under the old freight rates, would obtain a net return of $17.91 per gross ton. Under the new setup, the shipper still will get $17.91. However, the switching charge will be increased by 6 per cent to 89 cents per gross ton. Therefore, the mill consumer may pay $18.80.

Mobilization of Workers Seen Unlikely Before Fall

President Roosevelt last Friday asserted no labor shortages which would require mobilization of workers are expected before this fall. Whether any new mechanism will be needed at that time to direct the flow of labor to war work is still uncertain, he indicated.

In his discussion of strikes, he quoted from a pamphlet issued by the National Safety Council. In 1941, 30,000,000 man-days were lost through strikes, whereas respiratory illnesses ranging from colds to pneumonia caused the loss of 160,000,000 man-days and industrial accidents caused the loss of 460,000,000 man-days.

The President read from a letter sent to him by Donald M. Nelson showing that during February workers in the following industries worked these average numbers of hours per week.

Blast furnaces, 39.8; foundries, 46.9; electric machinery, 45.4; copper smelting, 39.6; brass and related products, 46.1; aluminum, 45.9; machine tools, 55; air-frames, 48.7; all engines, including aircraft, 51.1; shipbuilding, 48.2, and explosives, 44.9.

Mr. Roosevelt explained that blast furnaces and copper smelters, the only two averaging under 40 hours, are on a four-turn basis.

Replying to a question, he said he had heard only 10 minutes before that workers at the Bethlehem shipbuilding yard in San Francisco had offered to work on Sundays free, and he remarked he thought it was a grand thing.

New Limitations Imposed On Consumption of Tin

Army, Navy and certain other governmental agencies usually excepted must conform to a list of special restrictions on the use of tin, according to the terms of Conservation Order M-43-a, as amended by WPB.

The amended order contains a long list of restrictions on the use of tin. Government agencies as well as civilian industry must conform to these:

1. Lead base alloy, other than solder, must not contain more than 12 per cent tin by weight. The same rule applies to tin alloy.
2. Prior to May, 1, solder may have a tin content of 38 per cent by weight. After that, the amount is reduced to 30 per cent.
3. Collapsible tubes must not have more than 7½ per cent tin by weight.
4. No virgin tin may be used in the manufacture or treatment of type metal.
5. Tin in terne for terne plate is limited to 15 per cent by weight and for long ternes to 10 per cent.

Issuance of Metal License Plates Prohibited by WPB

WPB has banned the issuance by state or other local governments of metallic license plates except to new licensees and for small "date tabs" to be attached to plates already in existence.

These restrictions, embodied in Limitation Order L-32, do not apply to metal already cut or stamped on March 18.

State and local governments, during a licensing year, are permitted to issue metallic plates in quantities up to 10 per cent of the weight of the plates issued during the corresponding license year ending after June 30, 1941, and before July 1, 1942, for the following purposes only:

1. As replacement plates for those that may have been destroyed or lost.
2. To new licensees or registrants.
3. For issuing "date tabs" not more than 4 square inches to attach to plates already issued.

Coonley Named Chief of WPB Industrial Conservation Branch

Howard Coonley, chairman, Walworth Co., New York, and former president of the National Association of Manufacturers, has been appointed chief of the Simplification Branch of the WPB Bureau of Industrial Conservation.

Bituminous Coal Division, OPA Co-operate To Control Prices

Arrangements through which the Bituminous Coal Division of the Department of the Interior and the OPA will co-operate in taking whatever steps are necessary to prevent

wartime inflationary prices for this important fuel were announced last week in an exchange of letters by Secretary Harold L. Ickes and Price Administrator Leon Henderson.

Under the arrangement, the Bituminous Coal Division will recommend to OPA steps leading to appropriate action under the powers vested in OPA by the emergency price control act with reference to bituminous coal prices charged by producers, distributors, and sales agents.

OPA also will welcome any advice the division may offer regarding prices of bituminous coal sold at retail.

The division is empowered under the arrangement to handle hearings, conferences, correspondence, etc., where needed in order to discharge its recommendatory function in regard to producer and wholesale prices.

The arrangement was worked out under section 201 (a) of the price control act providing that the price administrator may utilize the services of other federal agencies in administering the act.

Secretary Ickes, in thus making available to OPA the extensive facilities and information of the Bituminous Coal Division, together with the services of his staff of experts in preparing recommendations, is facilitating administration of the price control act on an effective and economical basis.

WPB Priorities Bureau Appointments Announced

Appointments to the staff of the Bureau of Priorities, WPB, Division of Industry Operations, were announced last week by C. H. Mathiessen Jr., chief of the bureau. The executive staff of the bureau is now as follows:

Deputy chief, John P. Gregg.

Assistant chief, in charge of internal operations, Clem C. Crossland.

Assistant chief, in charge of policy, John H. Martin.

Assistant chief, in charge of enforcement, L. J. Martin.

Assistant chief, in charge of requirements, Henry P. Nelson; assistant, Jerome Low.

Assistant chief, in charge of priority specialists, Samuel S. Stratton; assistant, Spaulding Birss.

Assichant to the chief, assigned to Army and Navy Munitions Board, Clay C. Crawford.

Assistant to the chief, Arthur Harris.

Assistant to the chief, J. Wilton Peters.

Review and approval branch chief, Stanley L. Phraner.

Inventory branch chief, E. A. Tupper; assistant inventories, George P. Torrence; assistant, investigation, Hector J. Dowd.

Distributors branch chief, Linford C. White.

Compliance branch chief, John H. Ward.

Production requirements branch chief, A. L. Williams.

Education and industrial contact branch chief, E. E. Pratt.

Industrial contact section, Mason Manghum.

Head priority specialist, division of production, W. G. Glos.

Head priority specialist, office of petroleum co-ordinator, James E. Hughes.

Head priority specialist, division of materials, H. K. McCook.

Head priority specialist, division of industry operations, Joe M. Tucker.

Procedure section chief, E. V. Russ.

Civilian Goods Production Curtailed by War Board

Curtailment in the production of a variety of nonessential civilian goods was ordered last week by WPB.

Domestic laundry equipment, including washers and ironers, will be discontinued after April 15 or May 15, depending on the size of the producer.

Purchases, sales and rentals of new office machinery have been halted, except to persons possessing a preference rating of A-9 or higher.

OPA has been granted authority to ration new and used typewriters.

Production of civilian radios and phonographs will be discontinued after April 22.

Number of sizes of incandescent light bulbs to conserve critical materials is being studied. It is planned to reduce the number of sizes from 2500 to about 1000, and also to reduce the number of voltages.

Manufacture of vending machines will be prohibited after April 30.

OPA Permits Higher Prices On Three Machine Tools

Niagara Machine & Tool Works, Buffalo, has been authorized by the OPA to charge prices higher than its Oct. 1, 1941, list price for three of the machine tools it manufactures in order to encourage increased production of such machines for the war effort.

By a formal amendment to Price Schedule No. 67, the company is specifically allowed to sell its No. 59 single crank press for $4732, its No. 612-G double crank press for $10,693, and its 310 power squaring shear for $2600.

The costs of manufacture of these machines cannot be covered if sold on the Oct. 1 price level, the company maintained. The OPA has found this to be true and also that Oct. 10 prices, which the company listed and published before Oct. 1, are more in agreement with manufacturing costs. The amendment also allows the company to submit before April 15 the prices it proposes for other machine tools which are part of the series similar to the No. 59 single crank press and No. 612-G double crank press.

The company's request included 39 typical machines, but in the case of the remaining 36, the request was denied because it was felt that the maintenance of Oct. 1 prices on these machines would not impose any serious hardship on the company.

Two Billions To Be Spent for War Communication Equipment

Production of communication equipment needed by the military services is expected to exceed a rate of $125,000,000 a month by the end of the year, according to WPB estimates.

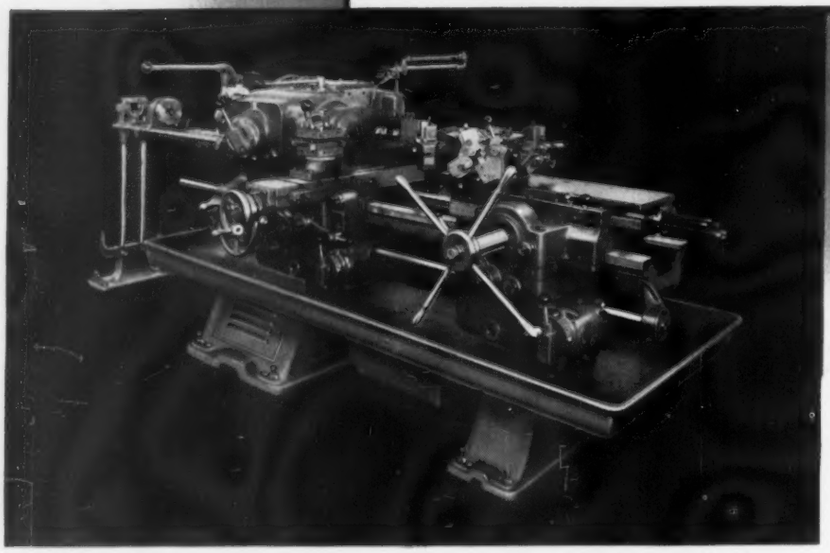
Program for this type of war materiel, including that delivered, on order, and yet to be allocated, amounts to approximately $2,000,000,000. About half of the program is for detector equipment; 20 per cent for aircraft and navigation equipment; 20 per cent for tank sets, walkie-talkies, etc.; and the remainder for telegraph, telephone, and miscellaneous equipment. About 120 set models are included, ranging in cost from $75 to $85,000 a unit, each made according to the most rigid specifications of the Army and Navy.

Every facility of the radio manufacturing industry will be used to produce this volume of military communication equipment. Some of the facilities are being provided by the conversion of electrical appliance plants, telephone equipment plants, air conditioning plants, refrigeration plants, and others not normally associated with the radio industry. But the conversion that strikes nearest the average man is that of the manufacturers of home radio receiving sets. The WPB ordered that after April 22 there will be no more sets made for civilian use. Their usual outlets cut off, most of the manufacturers will turn their energies to the production of military equipment.

All sets for civilian demand were made by a group of 55 manufacturers, ranging from companies with complete technical equipment capable of building entire units from raw materials, to companies that only assemble parts supplied by other plants.

Mr. Howe was ahead of

WHO invented the turret lathe? This still seems to be an open question. Prior to 1850 its principles were understood but had been used only in occasional special machines built by manufacturers for their own shops. Frederick W. Howe brought the turret lathe idea to Vermont in 1847. There Howe, Lawrence, Stone and Alvord built the first turret lathe for general sale. This pioneer model was built in the shop from which Jones & Lamson Machine Company is a direct successor.

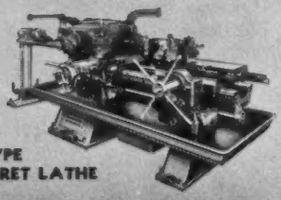


No. 3 Jones & Lamson Ram Type Universal Turret Lathe with standard bar equipment.

JONES

AUTOMATIC THREAD GRINDERS

OPTICAL COMPARATORS



RAM TYPE UNIVERSAL TURRET LATHE

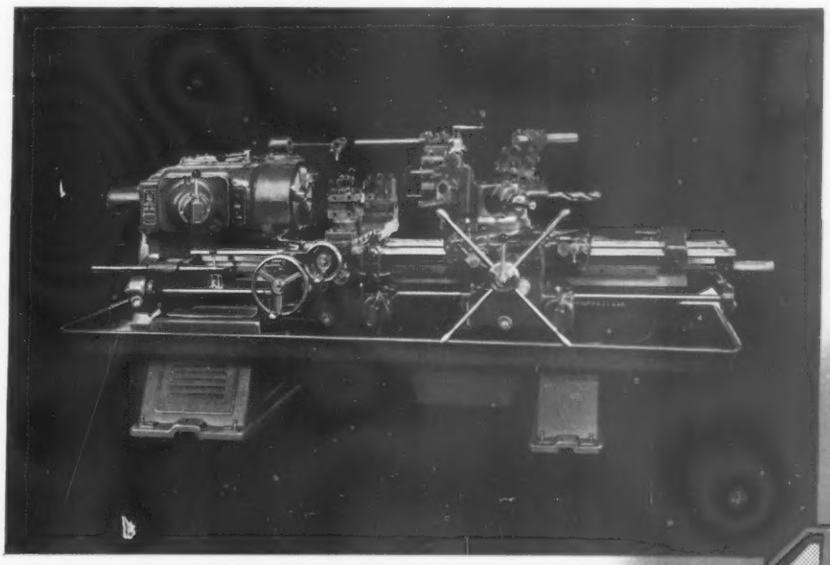
his time - and so are you!

FREDERICK W. HOWE was ahead of his time, and so are you, when your plant is equipped with modern Jones & Lamson Turret Lathes.

Modern Jones & Lamson Turret Lathes are ahead of the times in many ways. Into these new machines have been built ample reserves of speed, rigidity and useful power to enable you to take full advantage of every improvement in hard alloy cutting tools — available today *or liable to become available in the immediate future.*

Thus Jones & Lamson Turret Lathes can help you meet the urgent demands of immediate wartime production and still be available to help you in the hard years that lie ahead.

Among other reasons, this is why it pays to put your production problems up to Jones & Lamson. Write today, inclosing blueprints and ask for illustrated catalogs.



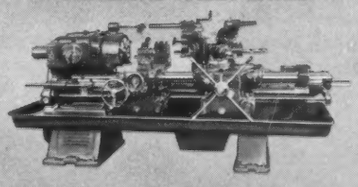
7A Jones & Lamson Saddle Type Universal Turret Lathe with standard chucking equipment.

& LAMSON
MACHINE COMPANY
Springfield, Vermont, U. S. A.

PROFIT PRODUCING
MACHINE TOOLS

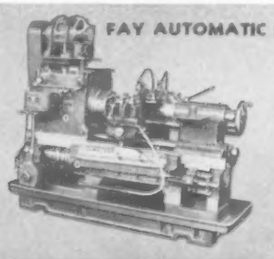
MANUFACTURERS OF: RAM & SADDLE TYPE UNIVERSAL TURRET LATHES . . . FAY AUTOMATIC LATHES . . . AUTOMATIC THREAD GRINDING MACHINES . . . COMPARATORS . . . AUTOMATIC OPENING THREADING DIES AND CHASERS

SADDLE TYPE
UNIVERSAL TURRET LATHE



AUTOMATIC OPENING
DIE HEADS

FAY AUTOMATIC LATHES



Fewer Reports on Priority Orders To Be Required by War Board

WASHINGTON

REPORTS required by WPB in connection with priority orders have been reduced by eliminating the requirement for submitting such reports from a substantial number of orders.

Priority Regulation No. 8 provides that all orders which require reports to be made on 43 PD forms are amended to eliminate that requirement, except for a few general preference rating orders. The forms which have been eliminated all have to do with the application of preference ratings assigned by "P" orders.

Regulation No. 8 is the first step in a move to eliminate all unnecessary or duplicating reports. The report forms which remain in use are being carefully studied, and an effort is being made to find others which can be eliminated.

Reports on the following forms need no longer be filed, except to the extent required by the orders listed in the last paragraph: 6, 6A, 13, 14, 30, 30A, 38, 41, 41A, 42, 42A, 43, 43A, 44, 44A, 45, 45A, 46, 46A, 47, 47A, 48, 48A, 52, 52A, 56, 56A, 57, 57A, 58, 58A, 63, 63A, 64, 65, 68, 68A, 74, 74A, 81, 81A, 93, 119.

When required by the following orders, reports on the forms listed above shall continue to be filed: 19, 19-a, 19-e, 19-h, 29, 42, 42-a, 43, 51, 56-a, 62, 65, 68, 73, 82, 86, 87, 95, 115.

"Affirmations of Compliance" No Longer Required by OPA

OPA has removed the provision requiring the filing of "affirmations of compliance" from the last 35 OPA price schedules in which this requirement remained.

These affirmations were a carryover from the period when OPA issued maximum price schedules under executive order of the President. The affirmation requirement either previously had been removed or never was included in other OPA price schedules.

Since all of the price schedules issued before the emergency price control act became effective are now enforceable under the new statute, it was felt that the affirmation of compliance requirement no longer was necessary.

OPA Orders Discounts on Bale Ties Reinstated

Producers of bale tie wire are required to reinstate customary minimum discounts of 40 cents per 100 pounds on their sales to manufacturers of bale ties, acording to an amendment to Price Schedule No. 6, iron and steel products, issued by OPA.

"Bale ties" are short lengths of bale tie wire with a twisted loop in one end and are sold in bundles largely to bale agricultural products, wastepaper, old rags, etc.

Price Schedule No. 6 issued April 17, required that manufacturers of iron and steel products continue "customary and general discounts." Bale tie wire and bale ties are both covered by this schedule.

Order Further Simplification of Plumbing, Heating Equipment

Schedule IV to Limitation Order L-42 requires producers of cast iron soil pipes and fittings to put the following simplified practices in effect on April 1.

1. Discontinuance of the manufacture of medium soil pipes.
2. A reduction in weights of extra heavy soil pipes.
3. Elimination of use of brass pipe plugs and brass-trap screws with soil pipe fittings.

Schedule IV is expected to result in the saving of considerable amounts of pig iron, scrap iron, and brass.

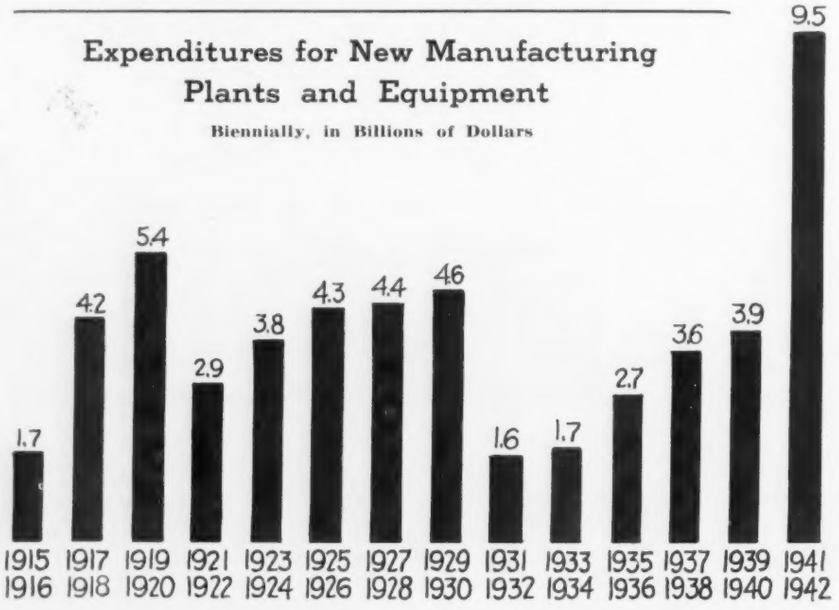
Producers are permitted to deliver soil pipes or fittings, not conforming to the simplified practices, if such pipes or fittings were in stock in finished form on April 1.

Previous schedules to Limitation Order L-42 required the simplification of valves, pipe fittings, metal jackets, fusible plugs, and tricocks.

Nelson Asks Senate Committee To Probe Guthrie Charges

WPB Chairman Donald M. Nelson last week asked the senate committee investigating the national defense program to investigate charges made by Robert R. Guthrie, former head of the Textile, Leather and Clothing Branch of WPB, when the latter resigned.

Mr. Guthrie declared industry representatives, both within and without WPB had consistently blocked efforts to convert the dye, cotton, nylon, woolen and other industries to full war production.



COMMITMENTS by government and private industry for new war plant expansion and industrial facilities in 1941 and 1942 will have a dollar value equal to the aggregate value of all expenditures for new manufacturing plant and equipment from 1933 through 1939. Increase is concentrated in metal, metalworking and transportation vehicle industries. Commitments totaled $9,500,000,000 by the end of 1941. Of this 85 per cent was government financed. New commitments made since then may increase the total war plant by 50 per cent.

The war plant expansion authorized is equivalent to a 42 per cent increase in the nation's entire peacetime manufacturing plant, as valued in 1940. Commitments of the Defense Plant Corp. alone reached $2,456,000,000 at the close of 1941. Options for plant purchase were granted in $1,703,000,000 of such contracts.

Chart reproduced from National Industrial Conference Board Road Maps of Industry. Sources of data: War Production Board; United States Department of Commerce and Conference Board.

Duties of 12 WPB Division Heads Clarified by War Production Chief

WAR Production Chief Donald M. Nelson last week announced a series of orders clarifying authorities, functions and responsibilities of directors or heads of 12 divisions or offices of the WPB. The general administrative orders are numbered 11 to 22. In each case, the authority vested in the official named is subject to the direction of the WPB chairman.

No. 11 makes the *director of the Production Division* "responsible for the production on schedule of aircraft, ordnance, tanks, ships, accessories, sub-assemblies and parts for them," and for construction of tools and industrial facilities with which to produce them. It gives him authority to "determine War Production Board policies, programs and methods in accordance with which the Army, the Navy and the Maritime Commission shall perform their functions with respect to production."

No. 12 delegates to the *director of the Purchases Division* "general direction over war purchasing," including the determination of the WPB policies in regard to purchase price and contract terms of all war purchasing by the various federal agencies and departments.

The order stipulates that members of a purchases policy committee, consisting of procurement representatives of various federal agencies, shall assist and advise the director in the formation of policy. The order also gives to the division's plant site board authority to approve or disapprove war plant sites, giving primary consideration to speed and quantity of production in relation to housing, power and transportation facilities, labor problems, food supply, taking fertile land out of production, and similar aspects.

No. 13 gives the director of the *Division of the Industry Operations* responsibility "for obtaining maximum use of existing industrial capacity for the production of war material and essential products for civilian use."

WPB Points of Contact

In co-operation with other divisions of the WPB, the director of industry operations has authority to effect maximum conversion of industry to war production, issue priority and allocation orders, curtail normal products. The industry branches of the division are designated as the WPB points of contact with the various industries.

No. 14 makes the *director of the Labor Division* responsible for those programs and policies of the WPB which affect labor's participation in the war effort, including labor supply and training and labor-management relations.

No. 15 delegates to the *director of the Materials Division* responsibility for making available materials needed for the war effort by expansion of production facilities and development of stockpiles. The order gives him authority to transmit to the War Shipping Administration priority schedules governing the transportation of materials and commodities essential to war production and essential civilian needs.

No. 16 gives the *chairman of the Requirements Committee* responsibility to determine the war and essential civilian needs of the United States and the other United Nations, to ascertain the supply of required materials and the amounts by which they should be increased and to determine and approve allocations of fabricated and semi-fabricated products to other of the United Nations.

No. 17 makes the *director of the Division of Civilian Supply* responsible for decisiions of the WPB "regarding critical materials, services and facilities as they relate to (1) the health and productive capacity of the population of the country or (2) essential work of business establishments other than war production."

The other orders relate to the directors of the remaining divisions.

Bakery Machinery Manufacturer Now Produces Trench Mortars

ONE of the simplest of all "artillery" items — trench mortars — require the same rigid interchangeable manufacturing requirements as do larger, more complicated articles of ordnance. There is no compromise with accuracy or finish of important surfaces.

Nature of the work, as well as degree to which mass production is being applied, are indicated by this photograph made in the plant of Read Machinery Co., York, Pa. In peace time the company concentrates on manufacture of bakery machinery. Today 60-millimeter trench mortars are turned out in mass for the United States Army.

The workman demonstrates how the fire cap is assembled with smooth bore barrel. The mortars are "muzzle loaders", and the fire cap combines functions of fixed breech ring, universal joint mounting and firing pin.

A vaned bomb is dropped down the barrel, being "lobbed out" by a propelling charge in its base, detonated by striking the fixed firing pin in the bottom of the barrel. The gunner gets his hand out of the way—or else.

NEA Photo

War Board Grants Railroads Broader Priority Assistance

WASHINGTON

RAILROADS have been given new and broader priorities assistance by the WPB to enable them to obtain critical materials necessary to maintain and operate their properties.

Preference Rating Order P-88 sets up a four-point rating system for materials going into railroad maintenance and repair. The plan makes available:

1. An A-1-a rating for delivery of materials needed for emergency repairs upon specific approval of WPB.
2. A rating on deliveries of raw materials, with the quantity and rating to be determined by WPB on a quarterly basis.
3. An A-3 rating for delivery of materials essential for track, structure, signal, communication system, and train and locomotive repair and operation, including perishable tools. Use of this rating will be controlled by quarterly inventory statements to be submitted to WPB.
4. An A-8 rating on all other maintenance, repair and operating supplies, which also will be controlled by quarterly inventory.

Each railroad may start operating under the order as soon as it has filed with WPB, on form PD-352, a statement showing its present inventories of repair and maintenance supplies. Pending the transition, the railroads will continue to function under P-100, the general maintenance and repair program carrying an A-10 rating, and under orders P-8 and P-21, both of which have been extended until April 30.

Order P-8 makes available an A-3 rating for materials going into the construction and maintenance of freight cars, and P-21 makes the same rating available for repair and rebuilding of steam, electric or diesel locomotives.

In another action affecting railroads, WPB extended until April 30 Preference Rating Order P-20, which makes available an A-3 rating for materials going into new construction of locomotives. Meanwhile, locomotive and freight car builders are being directed to change over to the Production Requirements Plan.

The ratings made available under P-88 may be used by a railroad or a supplier, and certain restrictions are set forth to prevent accumulation of excessive inventories. The order also directs railroads and suppliers to use conservation measures such as substitution, redesign and respecification to eliminate scarce materials.

CCC Fails To Conserve

LEFT to rust in an open snow-covered field are these 23 road graders, part of the equipment which has been abandoned or destroyed as a Civilian Conservation Corps camp was abandoned in Pennsylvania. According to a copyright story in the Philadelphia Inquirer, the CCC also is permitting usable trucks and tractors to rust and rot in open fields. One camp storehouse is said to be "packed with at least 1200 good truck tires, some virtually new; unpacked cases of woolen and other wearing apparel have been burned. NEA photo

Plate Shipments to Three Railroads Halted by WPB

In the first action of its kind taken under the terms of the steel plate allocation order, M-21-c, WPB has instructed suppliers of steel plates to make no further shipments, except for locomotive boilers and fire boxes, to the Pennsylvania railroad, New York Central railroad, and Louisville & Nashville railroad.

Action was taken as a result of information contained in the first filing of a new inventory report called for by the WPB Iron and Steel Branch.

Reports showed that in the case of the Pennsylvania railroad, inventory on hand in plates was approximately seven times the reported average monthly use; in the case of the Louisville & Nashville, inventory was more than 13 times the average monthly use, and for the New York Central the inventory was more than seven times the average monthly use.

Because of heavy military and naval demand for steel plate for tanks and ships, plate steel has been under strict allocation since Dec. 1, 1941.

Policy of WPB as expressed in Priorities Regulation No. 1, as amended, requires all users of scarce materials to keep inventories to a practicable working minimum.

Carriers' Requirements for Cars, Rails Ordered Filled

Acting on the recommendation of the Requirements Committee, WPB has directed that railroad requirements for 36,000 freight cars and 1,260,000 tons of heavy rail in 1942 be filled, William L. Batt, chairman, Requirements Committee, announced last week.

The Iron and Steel Branch has been instructed to schedule March requirements for steel shapes, sheets, bars and rails and to continue schedules until the authorizations made by the Supply, Priorities and Allocations Board on Jan. 1, 1942, have been filled.

The Transportation Branch will determine the distribution of these materials among United States railroads.

Aircraft production has increased 50 per cent since Dec. 7, War Production Chief Donald M. Nelson announced last week in his weekly radio report on the war effort.

Iron, Steel Expansion Program Several Months Behind Schedule

GOVERNMENT-sponsored iron and steel expansion program is not going very well. In general, the program is several months behind schedule and it continues to fall further behind.

Governmental red tape is the principal cause of delay. Other causes are priority difficulties, refusal by certain local union construction workers to work in threatening weather, and insufficient engineers, draftsmen and other specialists.

Delays caused by governmental red tape result from lack of co-operation between the WPB Iron and Steel Branch, the Defense Plant Corp. and the Army and Navy Munitions Board, and also from lack of close co-operation between some of the employes in these government offices.

All of the expansion projects originally were drawn up by the Iron and Steel Branch with individual iron and steel producers and then certified to the Defense Plant Corp. for financing. Delays caused by priority trouble came as a result of the Army and Navy Munitions Board overruling the priority ratings given to these projects by the Iron and Steel Branch. As a result, the Iron and Steel Branch has had to resort to allocations in order to get materials and equipment for the new plants. In fact, as high as 90 per cent of the materials and equipment for some of this new capacity has had to be placed under higher priorities or allocations.

The whole situation is a cause of grave concern to the iron and steel companies involved. This is not because of any fears on their part that there will be any scarcity of iron and steel to prosecute the war and to provide for all essential civilian needs; present capacity is more than adequate to take care of all these requirements.

Rather, they fear that the blame in the end will be placed on their doorsteps and the real offenders overlooked.

The attitude of the iron and steel industry is: "We are carrying out all government orders; if the government tells us to build more iron and steel capacity, we will get to work and build it as rapidly as we can".

Auto "Graveyard" Scrap Survey Organized in Northern Ohio

SURVEY of scrap in automobile "graveyards" is in process in Northern Ohio, designated as District No. 6 by the American Iron and Steel Institute and the WPB Bureau of Industrial Conservation.

The Northern Ohio effort is being directed by C. A. Ilgenfritz, manager of purchases and raw materials, Republic Steel Corp., Cleveland, and H. F. Black, field representative, Bureau of Industrial Conservation, temporarily located in the Republic building, Cleveland. At a meeting called by these men on Feb. 24, District No. 6 was broken down into six sections, each in charge of a captain as follows:

H. H. Waldschmidt, director of purchases, Youngstown Sheet & Tube Co., Youngstown, O.; James Reed, Timken Steel & Tube Division, Timken Roller Bearing Co., Canton, O.; W. J. Betzler, scrap buyer, Republic Steel Corp., Cleveland; H. O. Simmons, purchasing agent, Empire Sheet & Tin Plate Co., Mansfield, O.; J. L. Tillman, vice president, Unitcast Corp., Toledo, O.; Charles Knight, purchasing agent, Wheeling Steel Corp., Wheeling, W. Va.

Captains have the responsibility of locating all auto graveyard scrap in their sections and seeing to it that it is made available for consumption. The plan is to work through scrap dealers or brokers who, it is believed, can do the job faster, more efficiently and economically than if consumers were to buy direct.

As in the other 15 districts into which the country is separated, dealers are authorized to buy auto graveyard scrap at OPA ceiling prices. Auto graveyard owners who co-operate will be allowed to keep a reasonable inventory of parts so that they may remain in business.

Scrap Collection Drive Started at Pittsburgh

PITTSBURGH

Designed to collect scrap from industrial plants in this district, a campaign was launched last week at a meeting of the Purchasing Agents Association of Pittsburgh. George T. Weymouth, chief, WPB Industrial Salvage Section, announced the drive would be under the direction of a committee headed by Albion Bindley, vice president, Pittsburgh Steel Co., and George P. Rhodes Jr., WPB industrial salvage representative.

Mr. Rhodes will open an office here immediately to centralize workings of the "industrial center operations plan," which will include salvage not only of metals but of all usable waste material. In addition, the plan covers use of obsolete equipment, unused machinery and unused inventories, and provides for a technical field service to assist in solution of these problems.

Subcommittee chairmen for the campaign are J. W. Miller, Jones & Laughlin Steel Corp.; C. R. Stevens, Westinghouse Electric & Mfg. Co.; P. B. Duffy Jr., F. J. Kress Box Co.; and I. J. Stinson, Pennsylvania Rubber Co.

Numbers of the general committee are G. F. Hallman, Luria Bros. Co.; S. N. Joyce, Pittsburgh Crucible Steel Co.; R. O. Keefer, Aluminum Co. of America; E. L. McGraw, Allegheny Ludlum Steel Corp.; Charles R. Miller Jr., United States Steel Corp.; L. M. Potter, Vanadium-Alloys Steel Co.; G. W. Sanborn, United Engineering & Foundry Co.; E. L. Solomon, Max Solomon Co.; I. E. Walton, Heppenstall Co.; and D. L. Wilkoff, D. L. Wilkoff Co.

Daily Average Scrap Consumption At Record High in February

Average daily scrap consumption by steel mills reached an all-time high record in February, according to Edwin C. Barringer, president, Institute of Scrap Iron and Steel Inc., Washington, in announcing consumption of 4,276,000 gross tons as compared with 4,172,000 gross tons in February, 1941. For the first two months this year, 8,866,000 gross tons were consumed, against 8,450,000 for the period in 1941.

"Reports from all parts of the country show the scrap situation to be easing," said Mr. Barringer last week. "With the advent of spring the supply of scrap should become more plentiful. We are working to get enough scrap to run the mills of the country at capacity. Scrap yard inventories are at their very lowest figures and, in the main, yards throughout the country contain hardly enough scrap for the day-to-day preparation operations."

Mr. Barringer said there were indications that scrap collections from farms will exceed original estimates of 1,500,000 tons.

35 PLANTS *specify* TOCCO
for Hardening Armor-Piercing Shot

Another vital Defense job for *TOCCO* Induction Heat-Treating

In U. S. A., Canada and England, more than 35 contractors have specified TOCCO Induction Heat-Treating for *speedy, high-quality* hardening of armor-piercing shot. Some of the advantages of this new, simplified electric hardening process for this vital production assignment:

Minimizes rejects. No cracking problems. Split-second accuracy assures uniform results. Shot individually treated, eliminating risks of conventional batch treatment.

Doesn't require skilled labor. Simplified, automatic control permits use of girl operators, conserving skilled labor for other Defense work.

Can be installed in assembly line because unit is clean, cool, compact (only 7 ft. x 5 ft. max.).

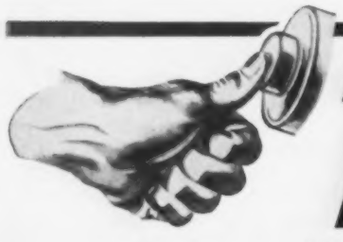
Matches production requirements. Makes possible outputs of hundreds, thousands or tens of thousands daily, depending on number of TOCCO units used and their size (20 to 125 K.W.).

For peace-time, too. 99% of TOCCO Jr. machines for Defense jobs are *standard*—adaptable to peace-time jobs by simply changing the work fixture.

Our production of TOCCO machines has been expanded 600% to meet vital defense demands. We're at your service!

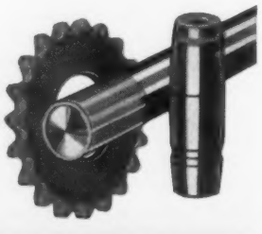
THE OHIO CRANKSHAFT COMPANY
Cleveland, Ohio

SPEEDY ELECTRIC HEAT IS GENERATED WITHIN THE SECTION TO BE HEAT-TREATED



TOCCO

World's Fastest, Most Accurate Heat-Treating Process



Mirrors of *MOTORDOM*

Union blasts bring new limitation order on replacement parts manufacture . . . Ask wage increase every 90 days in new contract . . . Accept "upgraders" in independent tool shops; test of co-operation still to come . . . Experiment in leveling off peaks in local transportation loads . . . Materials are now the bottleneck . . . Dealers' facilities of doubtful value on war work

By A. H. ALLEN
Detroit Editor, STEEL

DETROIT

A LITTLE knowledge is a dangerous thing—particularly in the hands of those with the power to distort such knowledge for their own selfish purposes. A good example is action of the UAW-CIO in screaming to the public and the WPB that the Ternstedt division of General Motors was trying to put something over on the government by making replacement parts out of stainless steel, chromium plated die castings and other critical metals; and further that Allison engine production was being hindered because manufacture of automobile parts was using up critical materials.

There is absolutely no substance to these allegations, but there is good reason why they were made. A union convention is coming up shortly and new contracts are about to be negotiated with motor companies. It is always necessary to start a little drum beating and hocuspocus to direct attention to forthcoming activities. The union blasts were successful in arousing the WPB at least, for they had no sooner been released (and published in newspapers of course) than limitation order L-69 was rushed out of the priorities office in Washington, completely restricting the use of critical metals in replacement parts.

Replacements at Premium

Under WPB sanction, the industry has been seeking to turn out a two-year supply of replacement parts in six months, so that after June all efforts can be concentrated on war production. A-3 priority was granted on materials for these parts, and everyone concerned took it for granted that such parts would naturally be the duplicates of those now on the cars for which they were designed. No one was trying to worm through any "loopholes" as the UAW charges. Now if you break a radiator grille on your 1939 Chevrolet, you will have to be content with a replacement that is painted and not plated, if indeed you will be able to get one at all.

What is to be done with the stocks of material on hand for replacement parts is the next question. Little of it can be used on any war products now in the works. Perhaps the auto companies will have to advertise it for sale, just as Fisher Body was doing last week with its stocks of strip and sheet steel.

UAW Demands

Citing figures on lost time since Jan. 1 at Delco-Remy plants in Anderson, Ind., the UAW-CIO seeks to prove that aluminum and steel shortages causing the lost time could have been averted by transferring materials from service lines to the Allison parts lines. The aluminum foundry in particular is said to have lost 168,000 man-hours since Jan. 1. Actually this is less than one week's work, since the plant employs on three shifts a total of 1100 men. The attempt to link up this loss with continuation of service parts manufacture is ridiculous, but apparently the UAW made its arguments stick with the WPB.

Major demands which the UAW-CIO has made for changes in its General Motors contract are an interesting commentary on the attitude of labor leaders in the current production drive. They will make fine reading for soldiers and sailors on duty at the far outposts of the world, and are as follows:

1. Contract to cover all employes, except those with authority to hire and fire, and those covered by other unions certified by NLRB.
2. Conditions of employment to be:
   a. New employes must become members within 30 days.
   b. Present employes must become members within 30 days.
   c. All employes to remain in good standing with local.
3. Shop steward for every 25 employes; chief steward for every 150.
4. Seniority broken only by quit or discharge.
5. Five hours "call-in pay."
6. Time and one-half for Saturday. (Packard, Hudson and Briggs are about the only companies now paying this premium.)
7. Armistice Day added to list of double-time holidays.
8. Ten per cent night shift premium when more than half the hours worked fall between 3:30 p.m. and midnight; 15 per cent night shift premium for hours between midnight and 8:00 a.m. (Straight 5 per cent premium now is paid.)
9. Thirty-minute paid lunch period.
10. Flat increase of $1 per day.
11. Increase in wages every 90 days based on cost of living index.
12. Defense bond of $100 maturity value in lieu of vacation. (Present vacation allowance is 40 hours' pay—average rate $1.10 per hour.)
13. Supervision shall not be allowed to work on any hourly rated jobs.
14. Fifteen days paid sick allowance time.
15. Sixty days' pay for employes entering military service. (GM now pays 80 hours wages or one-half month salary, has lost about 8000 out of 80,000 men eligible for military services.)

No Mention of Double-Time

No mention is made in the UAW demands of double-time for Sunday work, the omission being apparently a realization by the union that under swing shift operations where Sunday is a part of the regular 40-hour week, double pay cannot be justified. The double-time proposal was made originally solely as a means of stimulating work spreading in depression years. It is included in the present GM contract with the union, but likely will be removed from any new contract. It was expected the War Labor Board would make a decision on Sunday pay in its recent examination of the

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question, but the board surprised everyone, with the exception of the CIO, by referring the case back to the umpire for the contract who obviously could do nothing but interpret the wording of the contract which prohibited any suspension of double time for Sundays.

Companies which have tried to operate work shifts on a 7-day week basis, paying overtime for Saturday and Sunday, have found absenteeism mounting appallingly. In the case of General Motors it averaged only about 10 per cent, but Ford had absenteeism of 25 per cent, while in local tool and die shops it mounted to 56 per cent, completely disrupting work schedules.

"Upgrading" of Workers Likely

Acceptance of "upgraders" in the independent tool and die shops appeared possible last week following a meeting of the labor section of the WPB here, at which union representatives agreed to permit upgraders to work in exchange for stabilization of wages.

But failure to agree on wage levels at a later meeting brought a refusal from union leaders to permit these semi-skilled men to work in the job shops. The union demanded that auto companies raise the rates for their own tool and die makers 25 cents an hour to bring their rates equal to those paid by the independent tool shops. Sidney Hillman presided over the meeting and after failure to reach agreement he left the city with no indication as to when discussions might resume.

Upgraders are men who have been doing similar work in production shops and are anxious to learn the more precise skill required in tool and die work, and to earn the higher wages. Thousands more men are needed in the independent shops today if they are to work to capacity, and the training of upgraders, hitherto resisted by workmen in the independent shops, is the best answer. Should these upgraders eventually be permitted to work in the independent shops it remains to be seen whether they will receive necessary co-operation from present workmen, or whether a campaign of passive resistance to the fancied encroachment will be waged.

As employment mounts in war plants, the problem of transportation becomes more acute, especially in view of restrictions on new cars and tires. National attention is being focused on the so-called Pontiac plan for co-ordinating city transportation facilities. Essentially it is a plan for leveling out peak periods in bus transportation by staggering the opening and closing hours of industrial plants in different sections of the city, deferring store openings and closings until after peak periods in workmen loads, readjusting school hours, and persuading people to double up on private car transportation.

Private cars in Pontiac were found to be carrying an average of 1.3 persons per trip and efforts are being made to raise this to 3.5 persons. Pledge cards, registration cards, instructions for organizing riding clubs, windshield stickers and lapel buttons are the devices used to popularize the more efficient use of private cars. Weeks of preparatory work went into the plan which was placed in effect last Tuesday.

Machines Allotted to Others

Dismembered automobile assembly lines are being dispatched to various sections of the country to meet critical equipment demands. An auto body company here sent welding machines to a shipbuilding company in Mississippi. A spotting press was shipped across the country to an aircraft plant. Two stamping presses have been turned over to a railroad shop in Pennsylvania for work on armored cars. Grinding machines have been sold to a company specializing in production of hypodermic needles. A 120-ton vertical forging press, one of six such machines in the entire country and formerly used to form wheel hubs, was sent to Milwaukee.

As war production mounts, operating difficulties shift gradually from equipment to materials. Right at the moment materials shortages constitute the one serious factor which is holding back production. Automobile production experts, used to having materials and parts "floats" ranging anywhere from a week to a month, do not like the prospect of operating from day to day on materials, constantly confronted by the danger of having to shut down an entire plant because of the lack of perhaps one small part.

It is certainly not possible to legislate sufficient materials into the plants needing them. About the only solution is to hold back a little on final assemblies until materials and parts banks can be built up to better levels. But the words "hold back" do not appear in the automobile man's lexicon.

Automobile dealers are being urged to convert their display rooms and repair shops into war production plants, according to a recent address by Cyrus McCormick, OPA executive, who said that between 500 and 1000 of the nation's 44,000 dealers already are producing war materials or are preparing to do so. While it is true that there are many minor items which might be handled in a dealer's repair shop,

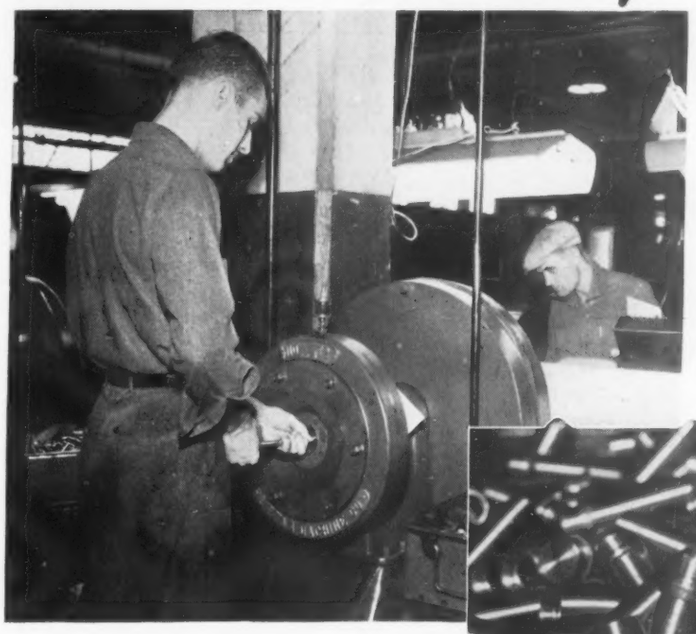
(*Please turn to Page* 48)

Chrysler Preparing To Treble Tank Production

PRODUCTION at the Chrysler tank arsenal in Detroit is now at capacity and it is going to be trebled by a $40,000,000 expansion program which will provide three more tank assembly lines. Here engineers are at work laying out floor plans of the expanded plant

Etna Swaging Machines

are ideal for defense production!



...HERE,

two No. 72 ETNAS are swaging copper bands on 20 m.m. shells at the rate of

900 PER HOUR

● The use of standard ETNA Swaging Machines for direct defense production is demonstrated by these two No. 72 ETNAS (one shown) employed by a prominent mid-western manufacturer for turning out 20 m.m. shells. The operation consists of swaging a narrow copper band around the shell . . . production is 900 per hour!

This clearly shows one of the many points of superiority embodied in swaging by ETNA. These units, helping to make shells now, can be used for normal work later! In other words, an ETNA purchased now for defense, is a money-saving, money-making investment for future use.

If you taper or size tubing or round solids . . . if you have small tubing assemblies, you can save by swaging. Call in the ETNA man for recommendations on your requirements. ETNA Swaging Machines are available in 3/8" to 4" diameter capacities—1" to 18" die lengths. Larger sizes are built to order.

IF IT'S A QUESTION OF TAPERING, SIZING OR REDUCING OF ROUND SOLIDS OR TUBING

"Ask ETNA about Swaging"

THE ETNA MACHINE COMPANY

TOLEDO . . . OHIO

Mirrors of Motordom

(*Concluded from Page* 46)

the major auto companies have discouraged their dealers from trying to set up to handle subcontracting from their factory organizations, principally because of the highly complex nature of most products and the lack of suitable equipment and skilled operators in most dealers' shops.

J. W. Frazer of Willys-Overland, is an exception, and has cited returns from a cross section of his dealer organization indicating availability of a number of lathes, shapers, grinders, welding machines and the like. Much of this equipment, however, likely is old and not too efficient, and the job of integrating the widely scattered shops would be terrific.

Deliveries of war materials by General Motors Corp. for the first quarter of this year will show an increase of 50 per cent over the last quarter of 1941 when deliveries totaled $158,300,000. In the 60 days following Dec. 7, General Motors' war commitments, including projects under study, multiplied 2¾ times, according to a recent statement of Alfred P. Sloan Jr., chairman, to stockholders.

* * *

Buick-built Pratt & Whitney engines for bombers are being produced this month at the rate originally planned for next December, with production nine months ahead of schedule. Trainload shipments are being made to airplane builders. H. H. Curtice, Buick general manager, states the originally scheduled 1942 output will be completed in the first six months of this year, and that by July the company will have built more engines than were scheduled originally through the first quarter of 1943. Official Air Corps 150-hour endurance test on the engine was completed in two weeks and was wholly successful.

* * *

Personnel of governing boards for the five product divisions of the Automotive Council for War Production has been announced as follows: Aircraft engines — R. N. Brown, Packard; J. W. Hines, Studebaker; G. H. Bernard, Nash-Kelvinator; W. R. Gerber, Chrysler; N. L. Bean, Ford; R. J. Beebe, Cadillac; E. R. Jacoby, Continental; Hugh Dean, Chevrolet, and C. A. Chayne, Buick.

Airframes—C. E. Bleicher, Chrysler; W. DeGroat, Ford; R. J. Scanlon, Hudson; A. J. Wettlaufer, Briggs; L. C. Hill, Murray; R. W. Clark, Hayes Mfg.; E. W. Higgins, Woodall Industries; A. J. Fisher, Fisher Body, and William C. Potthoff, Goodyear Aircraft.

Ammunition—E. A. Clark, Budd Wheel; P. C. Booty, International Harvester; G. F. Keyes, Mullins Mfg.; L. W. Klein, Gabriel Steel; K. C. Plasterer, Oldsmobile; William Steinweall, Stewart-Warner; H. Swanson, Falls Spring & Wire; S. D. Den Uyl, Bohn Aluminum, and H. E. Mead, Bowen Products.

Tanks, armored cars and parts—Del S. Harder, Fisher Body; Henry Ensign, American Car & Foundry; Dale Roeder, Ford; Jean Arnold, Cadillac; M. C. Evans, International Harvester; R. E. Ward, Mack Truck; R. J. Emmert, Yellow Truck, and E. J. Hunt, Chrysler.

In each case the first named man is chairman of the board.

Few Tires, but Trailer Industry Faces Boom

House trailer manufacturers will build a record output of 50,000 units in 1942 to be used only by workers in defense areas where other housing facilities are inadequate.

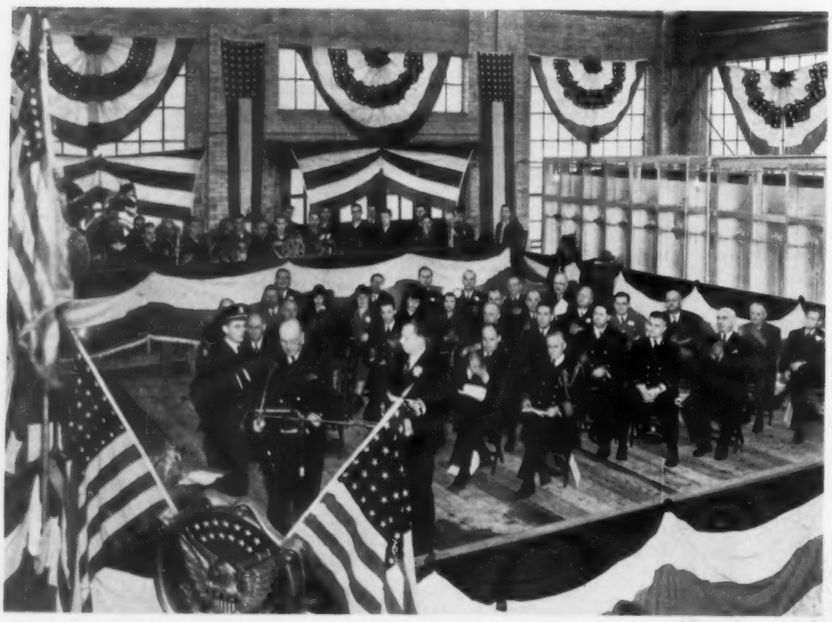
Manufacturers will be aided by operation of the Production Requirements Plan. WPB will insist that trailers are sold only to defense workers and that designs are simplified to conserve critical materials.

One of the most difficult problems confronting the trailer industry is the rubber shortage, and the resultant ban on the production and sale of tires. To keep the industry effective as a provider of defense housing, WPB has made available 4000 tires and tubes, or one set for each 50 trailers to be produced. These will be for delivery purposes only; after the trailer has reached its destination, tires will be removed and sent back to the factory and the trailer mounted on blocks.

An additional restriction on the use of tires on trailers permits manufacturers to buy only one set of tires for every five trailers produced.

The WPB House Trailer Section also is working with the industry to perfect a wooden tire for use on a wooden wheel, and one with a steel rim for use over an old rubber tire. If such substitutes became available, the industry plans to use them instead of rubber tires for transporting the trailers from factory to consumer.

Kropp Forge Co. Wins Navy "E" Pennant



UNITED States Navy "E" pennant and Bureau of Ordnance flag were presented to Kropp Forge Co., Chicago, recently. Rear Admiral John Downes, commandant of the ninth naval district, is at the speakers stand. At right is Roy A. Kropp, president of the company, while at left a naval aide holds the flags which Admiral Downes presented to Mr. Kropp

February Electric Truck Sales Reach 427 Units

Domestic bookings of electric industrial trucks totaled 427 units in February, Industrial Truck Statistical Association, Chicago, reports.

Total net value of chassis only was $1,495,730.86, compared with $1,262,812.40 in January.

Fifty-one nonelevating platform trucks had a net value of $153,725; 345 cantilever trucks were valued at $1,222,630.86; 17 light and heavy-duty tractors had total net value of $29,110; 13 crane trucks were valued at $86,400; one special truck had a base chassis price of $3885.

Canada To Make Magnesium Metal; New Plate Mill In

TORONTO, ONT.

WARTIME Metals Corp. has been organized to assume control of arrangements for production in Canada of metallic magnesium and for any other emergency projects that may be undertaken for production of metals. Head offices will be in Montreal. C. D. Howe, minister of munitions and supply, has announced that the government will spend about $5,000,000 on a project near Renfrew, Ont., where a plant using a new thermal method for producing magnesium from dolomite is being constructed.

Dominion Steel & Coal Corp. has placed its 110-inch plate mill at Sydney, N. S., in operation two months ahead of schedule. Its capacity is 180,000 tons annually. After supplying freight car builders with material to hasten completion of rolling stock contracts the mill will send all its plates to shipyards. The mill was built in 1918, for war production but was closed and dismantled in 1920. Department of Munitions and Supply started rehabilitation in April, 1941.

Automobile wreckers have been notified by F. B. Kilbourn, Canadian Steel Controller, that all wrecked cars on hand must be sold within 90 days. In the interval owners may remove parts for reuse or sale. After 90 days the Department of Munitions and Supply will take over unsold stocks, which will be scrapped.

Manufacture of civilian motor trucks in Canada has been forbidden by C. D. Howe, Minister of Munitions and Supply, except by permit. War needs for trucks will absorb all production. The order does not apply to buses. Trucks unsold in dealers' hands will be allocated by the dealers.

Polymer Corp. Ltd., a government-owned company, has been formed with headquarters in Toronto, Ont., to manufacture synthetic rubber. Plans are for production to be started before the end of 1943, plants to have capacity of 34,000 gross tons per year, all of which will be earmarked for war use. Four plants are planned.

War Stimulus For Vast Expansion in Chemicals

The chemical industry's total production this year is expected to exceed $2,000,000,000, and great expansion is under way.

Since the outbreak of war nearly $1,000,000,000 has been expended for new plants and conversion of existing facilities for production of explosives and processing chemicals, mainly from government funds. Within the United States "safety belt," there are now close to 150 new chemical and powder plants, each of which took from eight months to a year to build.

Specific instances of expansion described as noteworthy are stepped-up output of chlorine to make ethylene glycol for liquid-cooled engines; tetraethyl lead for 100-octane aviation fuels; magnesium chloride for aircraft metal and chlorinated solvents. Emphasis also is laid on the growing importance of synthetic rubber.

New England's Arms Orders Over $3 Billion

New England industries have contracted to turn out more than three billion dollars worth of ships, planes and other war materials, according to a survey by the New England Council.

Reporting in detail on the region's war effort, Theodore H. Beard, chairman of the council's industrial committee, said:

"In the first 18 months of the defense and war production program (June, 1940, through December, 1941) prime contracts and project orders of $50,000 or over awarded in New England by the Army, Navy and Maritime Commission amounted to $3,184,381,000. Supply contracts, which include aircraft, parts and engines and naval and merchant ship construction, as well as a long list of general manufactures, accounted for $2,694,238,000, or 84.6 per cent of the total awards, while the remaining 15.4 per cent represented project orders amounting to $490,143,000 for new industrial facilities, housing, and the improvement and expansion of military and naval establishments in the region.

"Approximately 50 per cent of the supply contracts awarded in New England were for the construction of naval and merchant ships. Private yards located in Maine, Massachusetts, Rhode Island and Connecticut are building well over two-thirds of this tonnage on a dollar basis, with contracts amounting to $943,900,000. The Fore River Yard of the Bethlehem Shipbuilding Corp. at Quincy, Mass., is the largest participant, with contracts totaling over $500,000,000.

"The manufacture of aircraft, parts and engines accounts for 17.8 per cent of the total supply contracts awarded in New England through December, 1941. The total value of aircraft contracts amounts to $479,061,000, 98.5 per cent of which is being produced in Connecticut, notably in Hartford and Bridgeport."

Kettle Manufacturer Now Produces "Tin Hats"

A CANADIAN plant which in peace time manufactured kettles and other cooking utensils now is producing these helmets for the armed forces. Dubbed "tin hats" by the soldiers, the helmets actually are of high-grade steel, subject to exacting tests. NEA photo, passed by Canadian censor

MEN of INDUSTRY

H. E. ROMAN, heretofore assistant wire mill superintendent, Northwestern Steel & Wire Co., Sterling, Ill., has been promoted to superintendent of the wire mill. He succeeds **P. M. Murphy,** who has become associated with the Republic Steel Corp. as superintendent of the wire mill in the Chicago district. **W. A. Blum** has been advanced from general foreman, wire drawing department, to assistant superintendent, wire mill, replacing Mr. Roman, while **Alexander Skekel,** formerly identified with Pittsburgh Steel Co., has become general foreman, wire drawing department.

♦

M. L. Sloan has been advanced from assistant manager to manager of the lamp department, General Electric Co., Nela Park, Cleveland. **J. E. Kewley** continues as vice president in charge of the lamp department, Nela Park.

♦

Ralph Kelly has been elected executive vice president, Baldwin Locomotive Works, Philadelphia. He formerly was vice president in charge of sales, Westinghouse Electric & Mfg. Co.

♦

Edward R. Stettinius Jr., lend-lease administrator, and former chairman of the board, United States Steel Corp., entered the University of Virginia hospital, Charlottesville, Va., last week to be treated for a kidney ailment.

♦

Robert Clade has been named works manager, valve division, American Car & Foundry Co., Detroit. **P. H. Sullivan,** former assistant district manager at Detroit, has retired.

♦

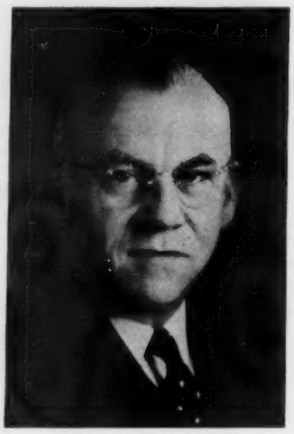
A. H. Wardwell has been named director of industrial relations, Pittsburgh district, Carnegie-Illinois Steel Corp. He recently was assistant to general superintendent, South Works, Chicago, and before that was assistant general superintendent at the McKeesport, Pa., plant.

♦

William Harris, 2667 Beverly street, Highland Park, Salt Lake City, has been appointed sales representative and service engineer by the Mining Division, Carboloy Co. Inc., Detroit, primarily for its Sinta-set products. He will cover the Northwest, including Washington, Oregon, California, Colorado, Idaho, Montana, Wyoming, Nevada, Utah, North and South Dakota.

♦

Joseph T. Wright has been appointed manager, compressor and tool division, Worthington Pump & Machinery Corp., Holyoke, Mass. He served as assistant works manager,



M. L. Sloan

Lodge & Shipley Machine Tool Co., during World War I; subsequently organized J. T. Wright Co., Cincinnati, and when that organization was merged with Harris-Seybold-Potter Co., Dayton, O., Mr. Wright continued to serve the latter in various capacities.

♦

Patrick Joyce, president, Chicago Great Western railroad, has been appointed chief of industrial plant protection for the Chicago area, which covers more than 1500 plants from Gary, Ind., to Waukegan, Ill.

♦

George J. Morton, formerly associated with Northern Pump Co., Minneapolis, as production engineer, has been appointed plant manager, Bass Foundry & Machine Division of National Industries Inc., Fort Wayne, Ind.

♦

G. W. Roberts, executive vice president, Athey Truss Wheel Co., Chicago, has been elected chairman of the board, and **A. E. Saidl,** formerly assistant secretary and assistant treasurer, has been made secretary and assistant treasurer. **Ray Betsinger,** vice president, has resigned to accept a position with the government in Washington.

♦

Gordon C. Sleeper has been named a member of the executive staff, Republic Aviation Corp., Farmingdale, N. Y., as assistant to **Ralph S. Damon,** president. He formerly was associated with the brokerage firm of Reynolds & Co., New York.

♦

C. E. Lewis, general sales manager, Delco Appliance Division of General Motors Sales Corp., Rochester, N. Y., was elected president, Oil Burner Institute, at its annual meeting in New York recently.

♦

French E. Dennison in charge of the small commercial refrigeration development department of York Ice Machinery Corp., York, Pa., has been called by the War Department to serve as chief inspector for the Philadelphia Ordnance District.

♦

V. L. Sanderson, Philadelphia, and his associate, **William Bradford,** Wilmington, Del., have been appointed sales representatives in eastern Pennsylvania, southern New Jersey, Delaware and Maryland for Cochrane Corp., Philadelphia.

♦

Earl O. Ewan, formerly in the public relations department of Johns-Manville Corp., New York, has been appointed assistant to the president in charge of public relations, Federal Shipbuilding & Dry Dock Co., Kearny, N. J.

♦

Thomas B. Myers, vice president and general manager, Hamilton Beach Division of Scovill Mfg. Co., Racine, Wis.; **William W. Coleman,** president, Bucyrus-Erie Co., South Milwaukee; and **Frank R. Bacon,** president, Cutler-Hammer Inc., Milwaukee, have been appointed to the advisory board of the Chicago Ordnance District.

♦

Bailey Meter Co., Cleveland, has made the following additions to its field engineering staff: **J. T. Elder** and **J. E. Wood** have been assigned the Atlanta, Ga., territory; **J. E. Lup-**

pold, Seattle; **E. P. Nye,** Buffalo; **R. B. Pogue,** Milwaukee; **W. D. Hilborn,** Houston, Tex.; **J. J. Haslam,** Kansas City, Mo.; **J. J. Wilber,** Cleveland; **C. E. Hicks,** New York; **J. R. Powell,** Pittsburgh; **S. G. Dukelow,** Denver; **R. V. Johnson,** Chicago; **W. D. Robinson,** Boston; and **C. C. Holtzman,** Philadelphia.

♦

George W. Mason, president, Nash-Kelvinator Corp., Detroit, has been elected a director of Square D Co., Detroit, to succeed **F. Eberstadt,** who has resigned to accept a government post.

Salesmen Aid Westinghouse Conversion to War Output

How salesmen trained for peacetime tasks have helped convert Westinghouse Electric & Mfg. Co. facilities to all-out war production was described before the recent meeting of the American Management Association in New York by Tomlinson Fort, assistant manager of the company's central station sales.

When defense and war demands closed normal channels of business, Westinghouse drafted their salesmen to aid in the change over to manufacture of war materials.

"They familiarized themselves with priorities regulations, located many urgently needed subcontractors, found new war uses for peacetime machines, and aided in placing retired electrical machines in active duty," Mr. Fort said.

DIED:

Edward T. Fishwick, vice president and director, Worthington Pump & Machinery Corp., Harrison, N. J., March 15, at his home in Glen Ridge, N. J. He has been associated with the company 50 years.

♦

Ray L. Williams, 55, service manager, Marion Steam Shovel Co., March 5, at his home in Marion, O.

♦

Albert Fisher, 78, a co-founder and first president, Fisher Body Co., Detroit, in that city, March 15.

♦

Charles A. Zentgraf, 56, for 12 years superintendent, Hill Acme Co., Cleveland, March 12, in that city.

♦

Morris S. Towson, 76, president and general manager, Elwell-Parker Electric Co., Cleveland, March 17, in Orlando, Fla. Mr. Towson had been associated with Elwell-Parker since 1895.

♦

Herman A. Uihlein, 55, president, Ben-Hur Mfg. Co., March 13, in San Antonio, Tex. He joined the Lavine Gear Co., Milwaukee, in 1910, and subsequently became president of the firm, now known as Ben-Hur Mfg. Co.

♦

Henry M. Lucas, 73, president and founder, Lucas Machine Tool Co., Cleveland, March 2, in that city. Mr. Lucas formerly was with Warner & Swasey Co., leaving that firm in 1900 to organize the Lucas company.

♦

Henry J. Baier, 67, chief engineer and master mechanic, Cleveland Twist Drill Co., Cleveland, for 46 years before his retirement nine months ago, March 3, in that city.

♦

J. A. Callahan, general manager, marine division, Bendix Aviation Corp., in New York, Feb. 28. Before joining Bendix three years ago he was general manager, plumbing ware division, Briggs Mfg. Co., Detroit.

♦

Angus Hopkins, 70, president, Hopkins Machinery Co., New York, March 1, in that city.

♦

Thomas Goodall, 44, Chicago sales manager, E. F. Hauserman Co., Cleveland, in Evanston, Ill., Feb. 25.

♦

Epley T. Fisher, 66, former president, C. H. Hoppe Foundry Co., Chicago, Feb. 26, in that city.

♦

William J. Chandler, 60, vice president and assistant secretary, Hansell-Elcock Co., Chicago, in that city, March 9.

♦

Dwight B. Lee, 68, Detroit industrialist, March 5, in that city. At time of his retirement in 1934 he was president and a director, Motor Products Co., and also a director of Kelvinator Corp.

♦

Andrew Christianson, 74, formerly chief engineer, Pullman-Standard Car Mfg. Co., Chicago, and more recently assistant to president, O. C. Duryea Corp., Chicago, March 5, in Battle Creek, Mich.

♦

Julius Blum, 57, president and treasurer, Julius Blum & Co. Inc., New York, fabricator of ornamental iron, steel and plastics, Feb. 27, in that city. He also was an official of the company's affiliate, Bright Steel Corp.

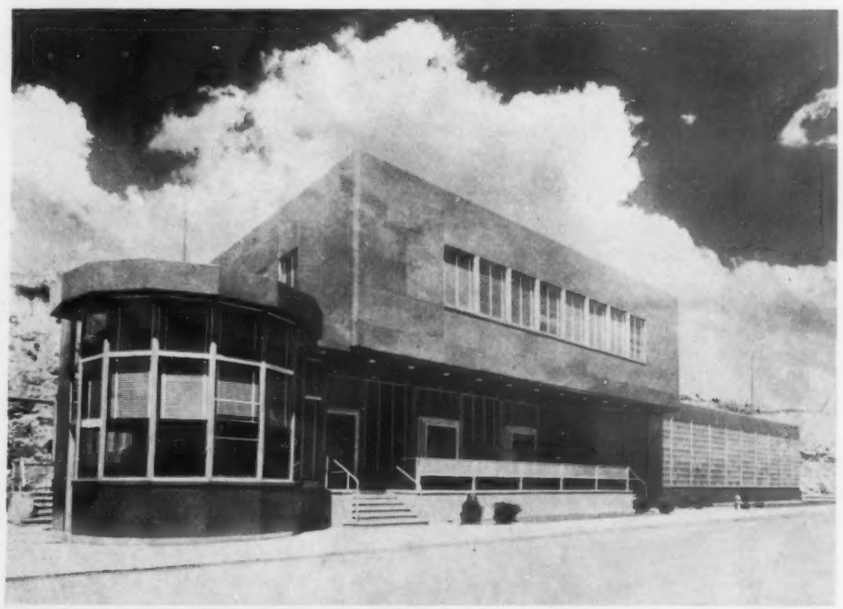
♦

Carl Pfanstiehl, 54, inventor and vice president and director of research, Pfanstiehl Chemical Co., Waukegan, Ill., at his home in Highland Park, Feb. 28. Mr. Pfanstiehl founded what is now known as Fansteel Metallurgical Co. and when he left the company 20 years ago the name was changed from Pfanstiehl to Fansteel. Mr. Pfanstiehl was granted 130 patents on metallurgical, automotive, electrical, chemical and radio inventions.

♦

Sam R. Steinberg, 64, founder, Chicago Metals Co., Chicago, in Phoenix, Ariz., recently.

Irvin Works' Hospital and Reception Building



HOSPITAL, personnel offices, and reception rooms for plant visitors are housed in this new building at Carnegie-Illinois Steel Corp.'s Irvin Works. Designed by Rust Engineering Co., Pittsburgh, it provides emergency hospitalization for accident cases and physical examination facilities for job applicants. Structure includes an officers' gage controlling entrance to the plant for protection

Activities of Steel Users, Makers

CATERPILLAR Military Engine Co., with corporate offices at East Peoria, Ill., has been formed as a wholly-owned subsidiary of Caterpillar Tractor Co. to co-operate with military engineers in planning and construction of an armament plant in Illinois. Final approval has been given by the War Department. The new company is headed by B. C. Heacock, president; T. R. Farley, vice president; William Blackie, secretary and treasurer. Directors include these officers and A. T. Brown and L. B. Neumiller.

♦

International Business Machines Corp., New York, has munitions contracts on hand and under negotiations which, when completed, will amount to over $150,000,000. The bulk of these munitions will be made at Endicott, N. Y., and large quantities will also be manufactured at Rochester and Poughkeepsie, N. Y., plants, the company states.

♦

Riveting Apparatus Inc., 200 Magee building, Pittsburgh, recently organized, will manufacture equipment for driving rivets cold. The company has been assigned patents held by Raymond S. Osborne, covering a pressure control mechanism designed to drive rivets cold to a uniform size at a rapid rate.

♦

Kollsman Instrument Division of Square D Co., Elmhurst, N. Y., will erect an addition to its plant to increase production of precision aircraft instruments. Equipment for the new plant, to be purchased by the parent company, will cost approximately $200,000, while the building, which is to cost $500,000, will be financed by Defense Plant Corp.

♦

Ferro Enamel Corp., Cleveland, has modified its trade mark for war purposes. The old trade mark consisted of a check and circle, while the new trade mark is a circle with the word "Victory" in it.

♦

Independent Pneumatic Tool Co., Chicago, recently moved its Detroit branch to a new building at 15605 Woodrow Wilson avenue, the fourth service station to be completed in the past 15 months.

♦

Surface Combustion Division of General Properties Inc., Toledo, O., has been awarded a contract to supply a Kathabar moisture control system for furnishing dry blast to Republic Steel Corp.'s new blast furnace at Alabama City, Ala.

♦

Timken-Detroit Axle Co., Detroit, has released a sound film in color entitled "A Declaration of War on Inefficiency in Truck and Bus Operation and Maintenance." Film is designed to aid operators in preventing breakdowns and deterioration of rolling equipment.

♦

American Agile Co., Cleveland, has completed its expansion program begun six months ago. Installation of hydraulic equipment and other allied machinery has quadrupled the company's output of welding electrodes.

♦

Reliance Electric & Engineering Co. and W. J. Schoenberger Co., both of Cleveland, have been notified they will receive the Navy "E" pennant for excellence in ordnance production. Reliance will receive the award March 24 and Schoenberger on April 10.

♦

United States Rubber Co. has been awarded contract by the War Department to operate a plant in Pennsylvania for manufacture of "TNT."

SAME semicircular steel shelters that are keeping the soldiers warm in Iceland, above, are keeping the marines cool in the palm-studded Panama Canal Zone, below. The buildings are called Nissen huts. Wide World photos

MEETINGS

Bend Testing Machine To Be Demonstrated at St. Louis

A NEW bend testing machine, designed and built under the auspices of a special subcommittee headed by W. R. Shimer, Bethlehem Steel Co., will be exhibited and demonstrated at the eleventh meeting of the Galvanizers Committee, Hotel Chase, St. Louis, April 20-21. Members of the committee will attend the opening sessions of the twenty-fourth annual meeting of the American Zinc Institute when subjects relating to slab zinc production and distribution will be discussed.

Convention Calendar

March 23-25—American Society of Mechanical Engineers. Spring meeting. Rice hotel, Houston, Tex. C. E. Davies, 29 W. 39th street, New York, is secretary.

March 26-28—American Society of Tool Engineers. Annual meeting at Hotel Jefferson, St. Louis. Ford R. Lamb, 2567 West Grand boulevard, Detroit, is secretary.

April 6-7—Machine Tool Electrification Forum. Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa.

April 14-17—Packaging Institute Inc. Packaging Exposition and Conference, Hotel Astor, New York. H. L. Stratton, 342 Madison avenue, New York, is secretary.

April 16-17 — Open-Hearth Committee. Twenty-fifth conference of open-hearth, blast furnace and raw materials committees, American Institute of Mining and Metallurgical Engineers at Hotel Netherland Plaza, Cincinnati. F. T. Sisco, 29 W. 39th street, New York, is secretary.

April 20-21 — Galvanizers Committee. Eleventh meeting at Hotel Chase, St. Louis. Sponsored by American Zinc Institute Inc. E. V. Gent, 60 East 42nd street, New York, is secretary.

April 20-21 — American Zinc Institute, Inc. Twenty-fourth annual meeting, Chase hotel, St. Louis. E. V. Gent, 60 East 42nd street, New York, is secretary.

April 20-24—American Chemical Society. Annual meeting, Memphis, Tenn. Dr. C. L. Parsons, 728 Mills building, Washington, is secretary.

April 20-24—American Foundrymen's Association. Foundry and Allied Industrial Show, Cleveland Auditorium and Exhibition Hall, Cleveland. R. E. Kennedy, 222 Adams street, Chicago, is secretary.

April 23-25—Concrete Reinforcing Steel Institute. Eighteenth annual meeting, The Homestead, Hot Springs, Va. H. C. Delzell, 228 N. LaSalle street, Chicago, is executive secretary.

April 27-30—Chamber of Commerce of the U. S. of America. Thirtieth annual meeting at Washington. Ralph Bradford, 1615 H street, Washington, is secretary.

April 27-May 1—American Mining Congress. Nineteenth annual coal convention and exposition, Cincinnati. J. D. Conover, 309 Munsey building, Washington, is secretary.

May 11-13—American Gear Manufacturers Association. Fifty-first annual meeting, Hotel Hershey, Hershey, Pa. J. C. McQuiston, 602 Shields building, Wilkinsburg, Pa., is manager-secretary.

May 19-20—National Metal Trades Association. Forty-fourth annual convention, Biltmore hotel, New York. Harry S. Flynn, Room 1021, 122 S. Michigan avenue, Chicago, is secretary.

May 27—American Iron and Steel Institute. Fifty-first meeting, Waldorf-Astoria, New York. George S. Rose, 1829 Empire State building, 350 Fifth avenue, New York, is secretary.

U. S. S. OBERON, another C-2 cargo vessel built for the Maritime Commission by Federal Shipbuilding & Dry Dock Co., Kearny, N. J., subsidiary of United States Steel Corp., was launched last week. This was the twenty-seventh vessel constructed by the company for the commission.

Want "War" Instead of "Defense" on U.S. Bonds

Ralph E. Flanders, president, New England Council, Boston, last week forwarded to Secretary of the Treasury Henry Morgenthau Jr., a suggestion by the council that the word "War" be substituted for "Defense" on bonds and stamps being sold by the government. "Defense" was held to be appropriate only as long as the United States was not at war. It is becoming clear that defense measures will not only not win the war but that continued reliance upon such measures may lose the war. References to "defense" are said to maintain a harmful psychology in the public mind.

Machine Tool Plant Addition Erected in Four Weeks

RAPID expansion to increase facilities for the manufacture of turret lathes is underway at Gisholt Machine Co., Madison, Wis. Upper photo shows ground being broken for a new 50,000-square foot addition. Lower view shows construction four weeks later. Scheduled to be completed by April 1, the addition will supply jobs for 550 more workers and will be operated on a three-shift, 168-hour week

Sub-Contract Opportunities

Data on subcontract work are issued by local offices of the Contract Distribution Branch, WPB. Contact either the office issuing the data or your nearest district office. Data on prime contracts also are issued by Contract Distribution offices, which usually have drawings and specifications, but bids should be submitted directly to contracting officers as indicated.

New York office, Contract Distribution Branch of WPB, 122 East Forty-Second street, New York, reports the following subcontract opportunities:

S-64: New Jersey firm making bomb fuzes is seeking subcontractors to furnish steel pins ½-inch diameter, 1½-inches long; brass pins ¼-inch diameter, 3-inches long. Quantity is 250,000. Requires "OO" automatic screw machine. Drawings available for inspection.

S-65: Long Island aircraft manufacturer needs subcontractors having internal and external grinding machines to handle work from ⅛-inch to ½-inch diameter, holding tolerances of .0005.

S-66: Long Island manufacturer of radio equipment for the Signal Corps is seeking subcontractors who have large capacity, multiple spindle automatic screw machines.

S-67: New York firm making tractor cranes wants subcontractors to furnish the following: Cast iron gear case; cast iron main hoist leg cap, 6 x 3 x 3 inches; cast iron main hoist drum, 18 x 12 inches; cast steel main hoist leg, 12 x 14 x 6 inches. Quantity 25 per month. Requires 10-foot planer, 3-foot radial drill, horizontal boring mill to swing 2-inch boring bar or No. 5 Morris taper spindle. Prime contractor will furnish castings.

S-68: New York manufacturer is seeking subcontractors to furnish small cannon recoil mechanisms. Parts are steel measuring up to 21-inches long, with tolerance to .0005. Quantity is large. Requires profilers, milling machines, turret lathes, screw machines, external and internal grinders. Internal grinding may be excluded if subcontractor is otherwise qualified.

S-69: Contractors sought to make one part of bomb rack, known as aircraft bar release. Part is steel, 12 x 2 x 1 inches. Quantity is 125,000 every three months. Requires steel forging facilities, including 1600-ton hammer.

Philadelphia office, Contract Distribution Branch, Production Division, WPB, Broad Street Station Building, reports the following subcontract opportunities:

15-B7-1: East Hartford, Conn. firm requires subcontracting facilities on counterweight brackets, counterweight caps, counterweights, cylinder heads, pistons, front cone, rear cone and combination wrench. Tools required: small drop hammer forgings, drilling up to ⅝, turret lathes No. 1 & No. 2, milling machine No. 2 & No. 3, automatic screw machines 3¼", cadmium and chromium plating, bonderizing, heat treating and grinding. Steel to be SAE 6135-4640-1035-6150. Tolerances .001. Plans and specifications on file at Philadelphia office and parts on view at Exhibit room.

15-B8-3: Harrisburg, Pa. firm requires subcontracting facilities on the following items: Bolts & nuts, ¼" x 1½" dia., ⅛" to 7" in length and studs, ⅜" to 1½" Dia., 2¼" to 8¾" in length. Material required is S.A.E. 1035. Tolerances: Commercial. Quantity: 16,625 bolts and nuts and 7,715 studs. Tools necessary for the work include single-spindle automatic screw machine or small turret lathe, and bolt threading and tapping machine.

16-B8-1: Philadelphia firm requires subcontracting facilities on the following: Seamless steel tubing from .84 to 15.00" Dia. 38,700 ft. required. Specifications at this office. Also power distribution panels, switch boards and hydraulic manifolds required. Steel castings under 500 lbs. Bronze and copper silicon castings 10 to 100 lbs. Drawings of the castings on file at this office. Materials to be furnished by subcontractors. Tolerances: .001 to .005.

13-B9-2: Navy requires subcontracting facilities on secondary drainage pumps, complete assemblies and spare parts. Patterns for castings only to be furnished by prime contractor. Quantity: Four complete pumps, assembled, and large quantity of spare parts. Tools required: Machine shop equipment for machining medium size castings and forgings including equipment for making worm reduction gearing. Prints and specifications are on file at this office.

14-B7-1: A Government arsenal requires subcontracting assistance on trail stops. Plate metal work up to ¼" is required with butt welding and seam welding. Material—low alloy Steel, grade 2; to be furnished by prime contractor. Fifty items required at commercial tolerances. Priority A-1-f. Plans and specifications at Philadelphia office.

14-B6-1: Philadelphia Ordnance District requires preliminary planning and procurement for various types of fuzes. Steel (bar and sheet), brass (rod and strip) seamless brass tubing and steel music wire are required. Tools necessary for the work include multi-spindle screw machines (¼" to 2⅝") and gear cutting equipment. Quantities and dates not settled.

Minneapolis office, Contract Distribution Branch, Production Division, WPB Midland Bank building, is seeking contractors for the following:

No. 173: Local contractor has work available for shops capable of handling thread cutting on worm shafts and cutting of worm gears. Forgings will be furnished. Quantities: 6000 desired at the rate of 200 per week beginning about April 1. Subcontractors should have gear hobbers, engine or turret lathes, external grinders, complete facilities for machining bronze worm gears.

No. 175: Wanted: To sublet by out-of-town prime contractor—Miscellaneous: Shaft turning, threading, key seating, splining, heat treating, grinding. Largest overall length 22 inches. Miscellaneous gear cutting of steel castings and blanks; largest 3 D.P. 85 teeth 3-inch face. A-1-a perference rating, reasonable tolerances, large initial quantity and production schedule to last for duration. May be bid on all or part of quantity for complete manufacture.

Low-Grade Cuban Nickel Ores To Be Developed

Nicaro Nickel Co., subsidiary of Freeport Sulphur Co., New York, will build a $20,000,000 plant, under a Defense Plant Corp. contract, to develop low-grade nickel ores in Cuba.

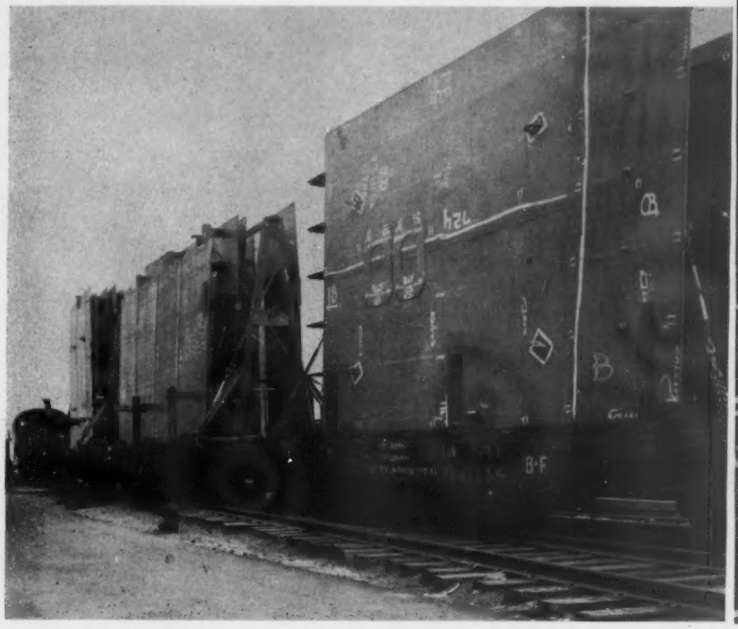
Freeport engineers and metallurgists have been experimenting for two years with a process for developing the Cuban ores at a test plant near Freeport, Tex.

Navy Vessel Launched in Chicago

FIRST United States Navy vessel built in Illinois during World War II, a 136-foot mine sweeper, slid down the ways at Chicago last week. Designed for inshore sweeping, the craft will proceed to salt water after equipment is installed and tests are made by Navy officials. NEA photo

Assembly Line Methods Used To Build 200 Liberty Ships

Plates Prefabricated in Freight Car Shops Also Speed Construction



ADAPTATION of the automobile industry's assembly line technique to build 200 Liberty cargo vessels by the end of 1943 was announced last week by the Maritime Commission.

A new shipyard, equivalent to 28 conventional shipways, will be built near New Orleans. A contract was signed with Higgins industries Inc., New Orleans.

Maritime Commission also announced award of a contract with W. A. Bechtel Co., San Francisco, for the construction of a six-way shipyard in the San Francisco Bay area and the construction of 34 Liberty ships.

The two contracts call for an expenditure of more than $400,000,000.

Since February, 1941, 1456 Liberty vessels have been ordered by the commission.

✦

PREFABRICATION is making possible the building of a Liberty ship every week at a large eastern shipyard; soon the yard will be turning out two of the simplified cargo vessels each week.

Subassemblies of the ships are fabricated in a huge plant, which formerly produced freight cars, and shipped six miles to the shipyard on flat cars, as shown above. Each subassembly is marked so that the shipyard workers know exactly where it goes. In upper right photo, a worker in the mold loft is painting over the marks made on steel plates from wooden templates, or patterns. The original markings are scratched on the steel, and then are brought out by painting in white.

At lower right, a maritime inspector is checking over, with the foreman, the stem assembly for a new member of the Liberty fleet. OEM photos

Iron Ore Shipped from 165 Lake Superior Mines in 1941

ONE hundred forty-four mines contributed to the record-breaking tonnage of iron ore shipped in 1941 from Lake Superior ranges. This was 25 more than were in operation in 1940. Active in 1941 were 92 on the Mesabi range, compared with 71 in 1940. Vermilion range had six compared with five the prior year; Cuyuna 13 compared with 12; Gogebic 15 against 14, and Marquette 18 compared with 17. On the Menominee range 21 mines were in production each year.

Largest shipper in 1941 was the Sellers mine, Mesabi, wih 10,098,342 tons, almost double the 1940 tonnage. Second largest was the Hull-Rust, 5,111,600 tons. The Missabe Mountain mine shipped 4,603,065 tons; Mahoning, 4,040,388 tons.

Total shipments from American mines in 1941, as announced by the Lake Superior Iron Ore Association, were 80,747,859 gross tons, 26.3 per cent greater than 63,948,846 tons shipped in 1940, and 22.1 per cent more than 66,157,359 tons in 1929. In addition, 462,747 tons were shipped in 1941 from the Michipicoten range in Canada.

Of the 1941 total Minnesota mines forwarded 64,060,726 tons and Michigan-Wisconsin mines 16,687,133 tons. Mesabi range mines contributed 59,772,543 tons, approximately 74 per cent of the season total.

Details of 1941 and 1940 shipments in gross tons by mines follow:

MESABI RANGE

Mine	1941	1940
Aad	463	
Adams Spruce Group	3,477,580	1,991,395
Agnew	304,847	306,711
Albany	807,949	524,742
Alice	85,430	54,225
Alice Fayal	24,109	
Alpena	6,601	481
Arcturus	1,037,912	808,149
Argonne	371,773	
Bennett	855,582	620,465
Biwabik	1,012,757	1,019,851
Bradford	46,695	
Bray (Mesabi Chief Tresp.)	143,249	167,920
Burt-Pool-Day	1,028,686	568,397
Canisteo	556,128	478,339
Carol	150,238	
Chatco	81,838	19,983
Commodore	61,895	1,869
Coons	280,808	267,453
Corsica	706,478	679,358
Dale	13,715	4,021
Danube	708,877	482,977
Draper	39,125	
Dunwoody	201,772	280,941
Dunwoody	4,322	
Fayal	11,203	16,025
Fraser	1,398,785	1,566,078
Galbraith	360,696	
Genoa-Sparta	50,685	49,330
Gilbert (Schley Tresp)	168,286	
Godfrey (Burt)	450,903	330,347
Godfrey (Glen)	143,902	219,339
Grant	581,691	1,064,000
Greenway	290,518	34,072
Harrison	457,348	1,617
Harrison and Patrick concentrat.*	178,817	384,185
Harrison Annex		19,475
Hartley-Burt	237,842	729,414
Hawkins	507,331	316,318
Hill Annex	3,645,350	2,991,038
Hill Trumbull	1,254,576	1,087,064
Hoadley	63,747	12,977
Holman-Cliffs	939,947	425,274
Hull Rust	5,111,600	3,901,971
Jo-Ann	7,604	
Judd	142,664	31,361
Julia	22,115	15,207
Kevin	937,458	81,047
Langdon		160,144
LaRue	282,460	104,351
Leonard-Burt	234,391	
Leonidas	405,710	572,083
Lincoln	804	
Mahoning	4,040,388	5,177,201
Majorca	151,467	
Mesabi Chief	431,078	716,617
Minnewas	814,573	1,088,635
Minorca	21,533	
Missabe Mountain	4,603,065	4,330,739
Mississippi No. 2		21,327
Morris	1,722,808	1,660,384
Morrison	1,026,673	799,506
North Harrison	199,309	84,025
North Harrison Annex		188,847
North Uno N.P.	43,401	
Pacific	29,034	107,063
Patrick-Ann	143,050	177,742
Penobscot	532,441	
Perkins Annex	149,181	
Pillsbury (Bradford Tresp.)	49	
Quinn	27,799	6,948
Reed	3,084	35,533
Rouchleau (Minnewas Tresp.)	2,747	
St. Paul-Day	190,964	
Sargent	127,521	130,886
Schley	263,137	
Scranton	1,025,323	587,010
Sellers	10,098,342	5,784,048
Shenango	384,742	203,272
Silver	71,191	52,874
Smith	4,876	
Snyder		42,204
South Agnew		60,750
South Uno G.N.	3,659	2,919
South Uno N.P.	13,055	19,651
Stein	378,687	150,064
Stephens (Pacific Tresp.)	3,715	2,086
Stevenson	167,232	
Susquehanna	876,787	606,628
Union	72,095	144,288
Virginia	316,819	193,372
Wabigon	278,238	
Wacootah	371,258	306,015
Walker	51,014	
Warren	416,340	
Webb	717,082	536,077
Wisstar	9,463	
York	93,461	60,542
Total	59,772,543	45,667,677

MENOMINEE RANGE

Mine	1941	1940
Baltic	7,924	2,738
Bates	158,173	170,064
Bengal	397,645	280,945
Berkshire		3,178
Beta	18,998	
Bradley	40,334	31,409
Buck	323,625	224,507
Cuff	10,774	
Davidson Group	318,624	300,920
Fogarty	39,851	43,307
Globe-Cornell	63,791	57,486
Hiawatha No. 1	298,696	279,095
Hiawatha No. 2	230,984	274,232
Homer	316,316	218,448
James	318,008	210,360
Loretto		39,606
Matilda	3,399	1,583
Penn Mines	881,693	661,924
Ravenna-Prickett	91,774	62,082
Rogers	55,950	3,074
Tobin-Columbia	232,240	24,681
Virgil	275,562	172,090
Wauseca	47,002	41,305
Total	4,131,363	3,103,334

MARQUETTE RANGE

Mine	1941	1940
Athens	659,451	668,009
Blueberry	340,279	334,651
Cambria-Jackson	316,257	303,953
Champion	106,928	
Cliffs Shaft	638,246	611,891
Gardner-Mackinaw	43,866	65,946
Greenwood	94,565	103,638
Lake Superior Holmes	217,114	301,398
Lloyd	457,923	510,591
Maas	877,807	950,426
Mary Charlotte	281,887	187,517
Morris	334,264	427,259
Negaunee	1,051,006	930,640
Princeton	12,476	273
Richmond	236,585	178,760
Stephenson	37,694	28,541
Tilden	292,443	163,629
Volunteer	255,600	153,341
Total	6,254,391	5,920,463

GOGEBIC RANGE

Mine	1941	1940
Anvil	303,053	277,575
Cary	340,772	227,260
Eureka-Asteroid	638,702	508,265
Geneva	62,183	
Ironton	181,273	236,443
Keweenaw	398,764	383,628
Montreal	1,141,641	999,402
Newport	649,357	605,983
Palms	33,100	2,977
Penokee Group	605,297	600,559
Plymouth	607,169	706,658
Puritan	50,055	222,746
Sunday Lake	611,515	572,306
Wakefield	228,070	209,802
West Davis	450,428	422,123
Total	6,301,379	5,975,727

CUYUNA RANGE

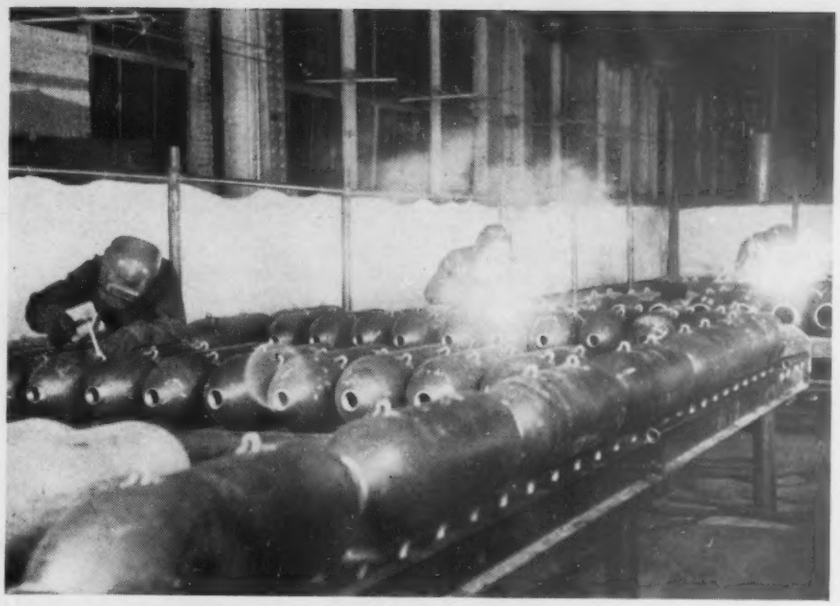
Mine	1941	1940
Alstead Group	237,358	170,930
Armour No. 1	208,399	232,566
Evergreen	175,888	118,574
Hopkins		5,170
Huntington	59,292	
Louise	211,029	106,113
Mahnomen	484,211	433,993
Maroco	3,922	6,011
Merritt	126,712	117,524
Northland	4,575	
Pennington	122,091	8,891
Portsmouth	169,527	160,421
Sagamore	451,236	255,544
Wearne	186,802	118,439
Total	2,441,042	1,734,176

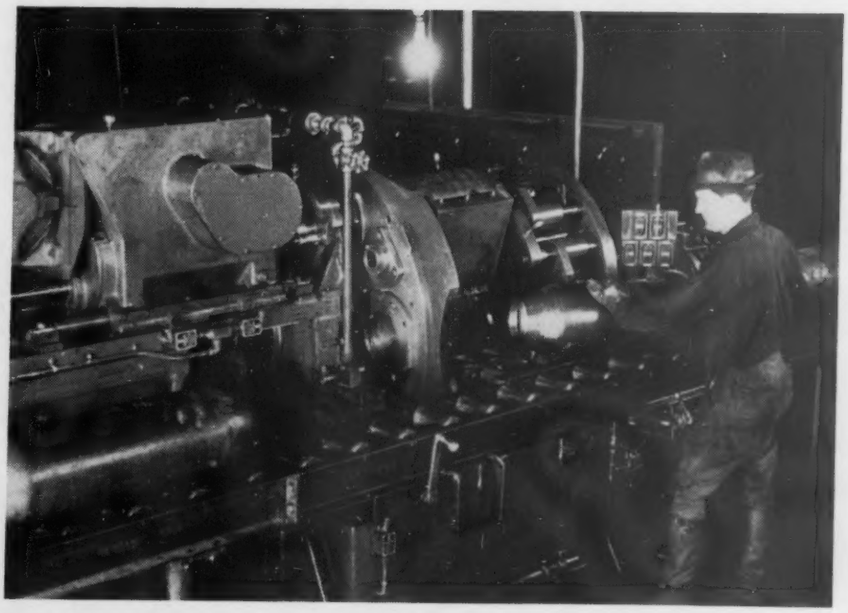
VERMILION RANGE

Mine	1941	1940
Chandler	172,421	113,601
Pioneer	543,470	560,467
Savoy	4,101	
Sibley	194,473	227,564
Soudan	187,674	195,029
Zenith	744,955	450,808
Total	1,847,094	1,547,469
Fillmore County, Minn. Fillmore	47	

GRAND TOTAL	80,747,859	63,948,846

*Tonnage not allocated to individual mines.





Three Quarters of U. S. Steel Output For War Purposes

MORE than three-fourths of United States Steel Corp.'s current steel shipments are for direct or indirect defense and lend-lease requirements, Irvings S. Olds, chairman, disclosed last week in the corporation's 1941 annual report.

The entire resources of the corporation and its subsidiaries have been at the call of the government throughout 1941, Mr. Olds said.

The report enumerated a wide variety of products being manufactured by subsidiaries for war purposes. In addition to all kinds of rolled and finished steel, the list included naval, maritime and other ships, armor and protective deck plate, bomb casings, unloaded shells, shell forgings, gun firing mechanisms, military pipe lines, naval propulsion equipment, submarine cable, torpedo impulse flasks, fabricated landing mats, wire netting for camouflage, steel for cartridge clips and bullet-core steel.

A feature of report is a series of photographs depicting operations at U. S. Steel plants with special emphasis on the manufacture of armor plate.

Shipments of rolled and finished steel during the year totaled more than 20,000,000 net tons—an all-time high and an increase of more than one-third over the shipments in 1940. The net tons of ingots produced by U. S. Steel subsidiaries also established an all-time record and represented an increase of more than one-fourth over the 1940 production. Rolled and finished steel production was maintained throughout the year in excess of full rated capacity, and ingot production was within a few points of full rated capacity. Important increases were

"Big Steel" Produces Casings for Bombs

CASINGS for bombs ranging from 17-pound fragmentation units to two-ton demolition bombs are being produced by United States Steel Corp. Processes in their manufacture are shown in accompanying photos, taken from the corporation's annual report. At top, suspension lugs are being welded to casings; center, casing is being "tailed"; lower photo shows nose and tail of casing being machined. Casings are formed from seamless tubing

made during the year in the rated ingot capacity.

Gross capital expenditures for additions and betterments to facilities aggregated about $111,000,000 in 1940, 1941, compared with $72,000,000 in 1940. Unexpended authorizations for all purposes at the end of 1941 amounted to $185,000,000 additional.

The chairman warned that shortage of scrap may constitute a limitation upon the effort to maintain maximum production during 1942, unless ways are found to make available large additional quantities of this essential material.

In addition to steel, nearly one-third of the nation's output of tar, ammonium sulphate, benzol and toluol, as well as substantial quantities of tar acids, are derived as by-products from coking operations. Nitration toluol is utilized in the production of explosives and ammonium sulphate will be used as fertilizer in increasingly larger quantities as the production of many essential agricultural commodities is expanded.

Loss of production resulting from strikes and work stoppages during 1941 was estimated by the chairman as the equivalent of 300,000 tons of steel, 5,000,000 tons of coal and 19 days of ship production.

During 1941 the corporation disposed of the largest volume of products and services in its history and received for them the largest sum of money in its history. It paid to its workers not only the highest hourly wage but also the highest average annual wage in its history.

Net income of the corporation and subsidiaries amounted in 1941 to $116,171,075 compared with $102,211,282 in 1940. After payment of like dividends for both years, there was left a balance for future needs of $56,138,390 in 1941, compared with $42,178,597 in the preceding year.

The dollar volume of sales in 1941 —$1.6 billion, was the highest in U. S. Steel's history; but reflecting the effect of unchanged scheduled prices of principal products in the face of increased tax, wage and material costs, the net income for 1941 was 41 per cent less than for 1929.

Cautioning that the 1941 net income cannot be regarded as typical earnings, Mr. Olds stated: "Income in 1941, after income taxes and all charges except interest on funded debt, amounted to 7.02 per cent, as compared with 6.99 per cent in 1940, of the value of the net assets, the latter being the total assets less current liabilities. The average return for the five-year period 1937-1941, on this basis, was 4.59 per cent, while for the ten-year period 1932-1941, which included the deficit years of 1932, 1933, 1934, and 1938, the average return was equivalent to 1.85 per cent of the value of the net assets."

Employment averaged approximately 304,000 for the year 1941, a greater number of employes than in any year of its history, and representing an increase of 51 per cent since 1938. The total payroll during the same period increased 113 per cent.

Annual payrolls rose to a new high of $601,117,053 compared with the total of $438,621,292 in 1940 and with $420,072,851 in 1929.

More than 18,000 employes of subsidiaries are receiving intensive training for skilled jobs to meet pressing war-time requirements and to provide for personnel replacement as a result of America's participation in the war, the report indicated. This employe training program, one of the largest in all of industry, has "contributed materially to the increase in the output of steel and other products."

The total tax provision of U. S. Steel in 1941 amounted to $191 million, or 124 per cent more than in 1940. These taxes for 1941 were equivalent to $22 for each outstanding share of common stock.

How U. S. Steel Earned Its Living 1902—1941

All Amounts are in Millions of Dollars

Year of Operation	Products & Services Sold	Services Bought	Taxes Provided	Wear of Facilities	Interest on Debt	Balance Remaining	Wages for Workers	Dividends Provided Preferred	Dividends Provided Common	Future Needs	Total for Facilities
1902 ..	422.2	159.9	2.4	27.8	21.3	210.8	120.5	35.7	20.3	34.3	90.3
1903 ..	395.3	161.2	3.0	29.3	25.6	176.2	120.8	30.4	12.7	12.3	55.4
1904 ..	324.7	143.3	3.1	18.2	30.1	130.0	99.8	25.2	....	5.0	30.2
1905 ..	409.4	151.3	3.6	28.0	29.8	196.7	128.1	25.2	....	43.4	68.6
1906 ..	484.5	169.2	4.4	35.6	29.4	245.9	147.8	25.2	10.2	62.7	98.1
1907 ..	504.7	171.6	5.4	32.9	29.4	265.4	160.8	25.2	10.2	69.2	104.6
1908 ..	331.8	106.5	5.4	22.4	31.3	166.2	120.5	25.2	10.2	10.3	45.7
1909 ..	442.5	142.3	8.7	29.3	31.5	230.7	151.7	25.2	20.3	33.5	79.0
1910 ..	492.6	160.2	9.2	30.2	30.6	262.4	175.0	25.2	25.4	36.8	87.4
1911 ..	433.0	149.4	9.6	26.0	31.1	216.9	161.6	25.2	25.4	4.7	55.3
1912 ..	535.5	218.2	9.8	31.1	32.6	243.8	189.6	25.2	25.4	3.6	54.2
1913 ..	561.7	194.6	13.2	31.9	33.3	288.7	207.5	25.2	25.4	30.6	81.2
1914 ..	413.2	156.2	12.6	25.1	33.2	186.1	162.7	25.2	15.2	17.0*	23.4
1915 ..	524.9	192.9	13.6	32.4	32.8	253.2	177.3	25.2	6.4	44.3	75.9
1916 ..	903.0	269.5	26.6	39.5	32.0	535.4	263.9	25.2	44.5	201.8	271.5
1917 ..	1276.4	370.4	252.3	50.6	31.0	572.1	347.9	25.2	91.5	107.5	224.2
1918 ..	1328.2	380.9	297.6	40.7	30.7	578.3	453.0	25.2	71.2	28.9	125.3
1919 ..	1109.9	396.2	81.6	45.5	30.1	556.5	479.7	25.2	25.4	26.2	76.8
1920 ..	1295.8	452.1	76.2	46.7	29.3	691.5	581.8	25.2	25.4	59.1	109.7
1921 ..	725.9	253.1	37.7	36.8	28.5	369.8	333.2	25.2	25.4	14.0*	36.6
1922 ..	809.3	339.4	35.8	42.7	28.4	363.0	323.4	25.2	25.4	11.0*	39.6
1923 ..	1093.6	379.9	55.1	51.5	28.0	579.1	470.4	25.2	29.2	54.3	108.7
1924 ..	920.7	270.6	45.3	48.9	27.3	528.6	443.5	25.2	35.6	24.3	85.1
1925 ..	1023.8	340.9	50.9	56.1	27.1	548.8	458.2	25.2	35.6	29.8	90.6
1926 ..	1087.2	357.8	52.4	64.2	26.8	586.0	469.3	25.2	35.6	55.9	116.7
1927 ..	962.0	330.1	46.3	58.9	26.1	500.6	412.7	25.2	49.8	12.9	87.9
1928 ..	1011.0	350.1	51.0	67.2	25.7	517.0	402.9	25.2	49.8	39.1	114.1
1929 ..	1094.1	353.2	55.0	63.3	14.9	607.7	410.2	25.2	63.8	108.5	197.5
1930 ..	840.2	251.8	48.1	58.6	5.6	476.1	371.7	25.2	60.4	18.8	104.4
1931 ..	551.1	192.7	34.2	47.3	5.5	271.4	258.4	25.2	37.0	49.2*	13.0
1932 ..	288.7	144.1	31.7	40.3	5.3	67.3	138.5	20.7	....	91.9*	71.2*
1933 ..	377.2	165.3	31.7	43.6	5.2	131.4	167.9	7.2	....	43.7*	36.5*
1934 ..	423.2	144.6	35.8	44.6	5.1	193.1	214.8	7.2	....	28.9*	21.7*
1935 ..	544.2	198.2	38.4	47.6	5.0	255.0	253.9	7.2	....	6.1*	1.1
1936 ..	796.3	295.5	52.9	56.8	4.9	386.2	335.7	50.4	....	.1	50.5
1937 ..	1028.8	346.2	88.0	60.9	5.1	528.6	433.7	58.5	8.7	27.7	94.9
1938 ..	611.4	229.7	48.8	49.2	8.3	275.4	283.1	25.2	....	32.9*	7.7*
1939 ..	857.1	306.7	67.0	61.2	9.3	412.9	371.8	25.2	..	15.9	41.1
1940 ..	1080.9	361.6	85.4	71.1	13.6	549.2	447.0	25.2	34.8	42.2	102.2
1941 ..	1623.4	608.5	191.5	95.8	6.0	721.6	605.4	25.2	34.8	56.2	116.2

The data are based on the yearly earnings reported annually to stockholders and have not been adjusted to reflect surplus charges and credits. The data are in some respects necessarily approximate rather than exact figures. For example, wages represented in inventory expansion in one year are more properly a subdivision of the succeeding year's sales than of the given years. Taxes are as accrued before adjustments. Products and services are after approximating inter-company transportation revenues and include miscellaneous income and deductions. Certain of the previously published figures have been revised—payroll for new construction having been excluded from wages for workers after 1926 and pension payments having been included in wages for workers after 1910; the net amounts of these revisions are shown in products and services bought and balance remaining items. (*denotes **deficit.**)

Steel Mill Inventories Reduced in January

Value of steel mill inventories in January was 126.7, compared with 129.2 in December and 126.4 in January of last year, based on 1939 as 100, according to the monthly industry survey of the Department of Commerce.

The department's figures show also that the value of steel mill new orders in January was 245, compared with 248 in December and 256 in January of last year, taking January, 1939, at 100.

Also taking January, 1939, at 100, the value of steel mill shipments in January was 242, compared with 257 in December and 190 in January of last year.

There was an increase of 1 per cent in January over December in the value of unfilled steel orders and there was an increase of 102 per cent in January of this year compared with the same month of last year.

The *BUSINESS TREND*

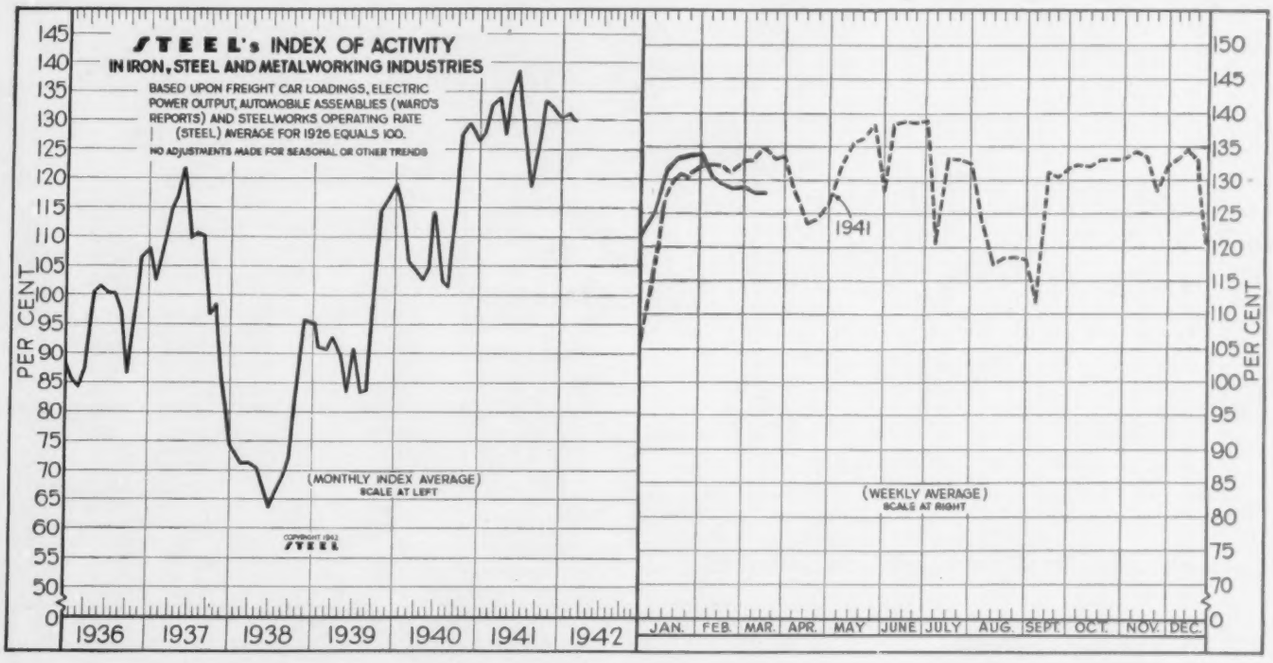
Index of Activity Declines Slightly

STEEL'S index of activity in the iron, steel and metalworking industries held unchanged during the week ended March 7 despite a decline in electric power consumption and steelmaking operations. A year ago the index stood at the 135 level, or substantially above the current index figure of 128.3. The all time peak recorded by the index of 138.8 occurred during the week ended June 28 last year.

The national steel rate was off one point to 95.5 per cent in the week ended March 14 and also compared unfavorably with 98.5 recorded in the same week last year. Revenue freight carloadings advanced to 799,356 cars during the latest week, more than offsetting the decline recorded in the preceding period.

Electric power consumption amounted to 3,357,444,000 kilowatts, off slightly from the previous week but represented a gain of 12.5 per cent over the total registered in the corresponding period a year ago.

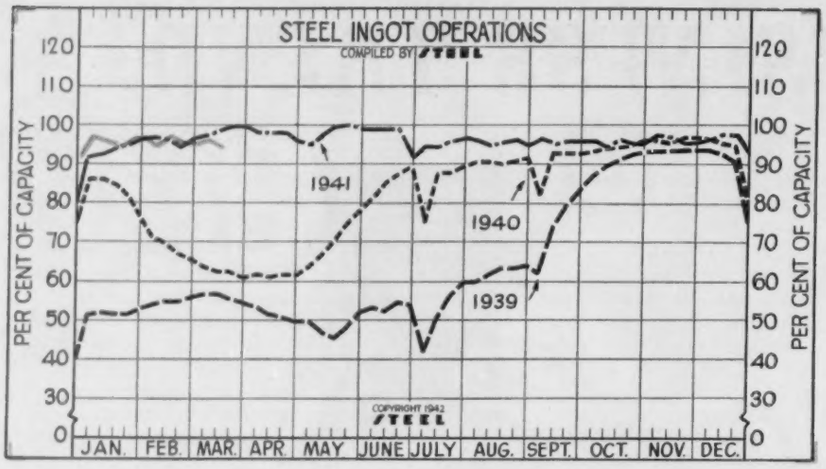
Downward tendency in long range forward buying is illustrated in the Detroit Purchasing Agents Association's recent report which points out that 7 per cent of its members were buying nine months or more ahead in February, against 10 per cent in January and 18 per cent a year ago. The number buying on a hand-to-mouth basis rose to 7 per cent of the total, a proportion which had not existed since June, 1940.


STEEL's INDEX OF ACTIVITY
IN IRON, STEEL AND METALWORKING INDUSTRIES
BASED UPON FREIGHT CAR LOADINGS, ELECTRIC POWER OUTPUT, AUTOMOBILE ASSEMBLIES (WARD'S REPORTS) AND STEELWORKS OPERATING RATE
(STEEL) AVERAGE FOR 1926 EQUALS 100.
NO ADJUSTMENTS MADE FOR SEASONAL OR OTHER TRENDS
PER CENT
(MONTHLY INDEX AVERAGE) SCALE AT LEFT
1936 1937 1938 1939 1940 1941 1942
1941
(WEEKLY AVERAGE) SCALE AT RIGHT
JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC.

STEEL'S index of activity remained unchanged at 128.3 in the week ended March 14:

Week Ended	1942	1941
Jan. 3	124.7	114.5
Jan. 10	131.2	128.2
Jan. 17	133.1	130.8
Jan. 24	133.7	130.7
Jan. 31	133.9	132.0
Feb. 7	130.6	132.7
Feb. 14	129.8	132.3
Feb. 21	129.0	131.2
Feb. 28	129.1	133.0
Mar. 7	128.3	133.1
Mar. 14	128.3	135.0

Mo. Data	1942	1941	1940	1939	1938	1937	1936	1935	1934	1933	1932	1931
Jan.	131.3	127.3	114.7	91.1	73.3	102.9	85.9	74.2	58.8	48.6	54.6	69.1
Feb.	129.6	132.3	105.8	90.8	71.1	106.8	84.3	82.0	73.9	48.2	55.3	75.5
March		133.9	104.1	92.6	71.2	114.4	87.7	83.1	78.9	44.5	54.2	80.4
April		127.2	102.7	89.8	70.8	116.6	100.8	85.0	83.6	52.4	52.8	81.0
May		134.8	104.6	83.4	67.4	121.7	101.8	81.8	83.7	63.5	54.8	78.6
June		138.7	114.1	90.9	63.4	109.9	100.3	77.4	80.6	70.3	51.4	72.1
July		128.7	102.4	83.5	66.2	110.4	100.1	75.3	63.7	77.1	47.1	67.3
Aug.		118.1	101.1	83.9	68.7	110.0	97.1	76.7	63.0	74.1	45.0	67.4
Sept.		126.4	113.5	98.0	72.5	96.8	86.7	69.7	56.9	68.0	46.5	64.3
Oct.		133.1	127.8	114.9	83.6	98.1	94.8	77.0	56.4	63.1	48.4	59.2
Nov.		132.2	129.5	116.2	95.9	84.1	106.4	88.1	54.9	52.8	47.5	54.4
Dec.		130.2	126.3	118.9	95.1	74.7	107.6	88.2	58.9	54.0	46.2	51.3



Steel Ingot Operations

(Per Cent)

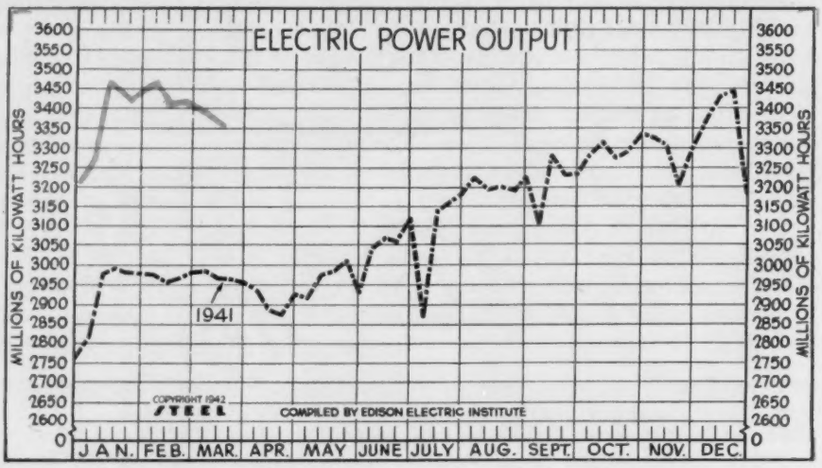
Week ended	1942	1941	1940	1939
Mar. 14	95.5	98.5	62.5	56.5
Mar. 7	96.5	97.5	63.5	56.5
Feb. 28	96.0	96.5	65.5	56.0
Feb. 21	96.0†	94.5	67.0	55.0
Feb. 14	97.0	96.5	69.0	55.0
Feb. 7	96.0	97.0	71.0	54.0
Jan. 31	97.0	97.0	76.5	53.0
Jan. 24	97.0	95.5	81.5	51.5
Jan. 17	96.0	94.5	84.5	51.5
Jan. 10	96.5	93.0	86.0	52.0
Jan. 3	97.5	92.5	86.5	51.5
Week ended	**1941**	**1940**	**1939**	**1938**
Dec. 27	93.5	80.0	75.5	40.0
Dec. 20	97.5	95.0	90.5	52.0
Dec. 13	97.1	95.5	92.5	58.0

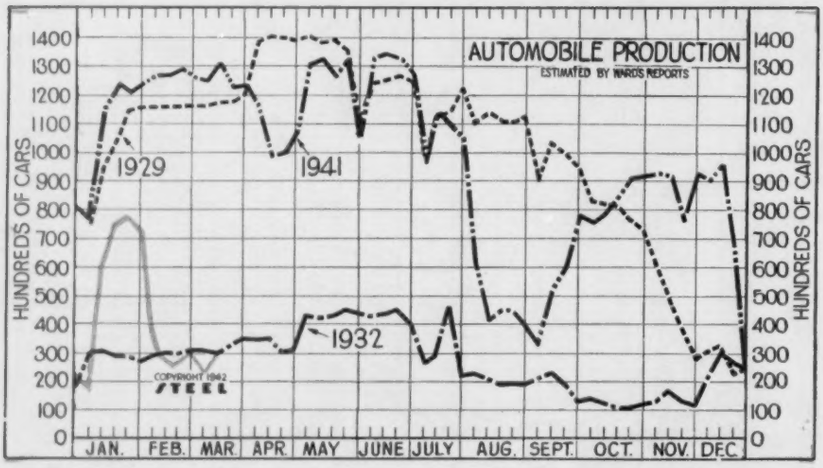
†Since Feb. 21 rate is based on new capacity figures as of Dec. 31 last.

Electric Power Output

(Million KWH)

Week ended	1942	1941	1940	1939
Mar. 14	3,357	2,965	2,550	2,276
Mar. 7	3,392	2,987	2,553	2,285
Feb. 28	3,410	2,982	2,568	2,294
Feb. 21	3,424	2,968	2,547	2,269
Feb. 14	3,422	2,959	2,565	2,297
Feb. 7	3,475	2,973	2,616	2,315
Jan. 31	2,468	2,978	2,633	2,327
Jan. 24	3,440	2,980	2,661	2,340
Jan. 17	3,450	2,996	2,674	2,342
Jan. 10	3,473	2,985	2,688	2,329
Jan. 3	3,287	2,831	2,558	2,239
Week ended	**1941**	**1940**	**1939**	**1938**
Dec. 27	3,234	2,757	2,465	2,175
Dec. 20	3,449	3,052	2,712	2,425
Dec. 13	3,431	3,004	2,674	2,390
Dec. 6	3,369	2,976	2,654	2,377
Nov. 29	3,295	2,932	2,605	2,335


ELECTRIC POWER OUTPUT
MILLIONS OF KILOWATT HOURS
1941
COPYRIGHT 1942 STEEL
COMPILED BY EDISON ELECTRIC INSTITUTE
JAN. FEB. MAR. APR. MAY JUNE JULY AUG. SEPT. OCT. NOV. DEC.



Auto Production

(1000 Units)

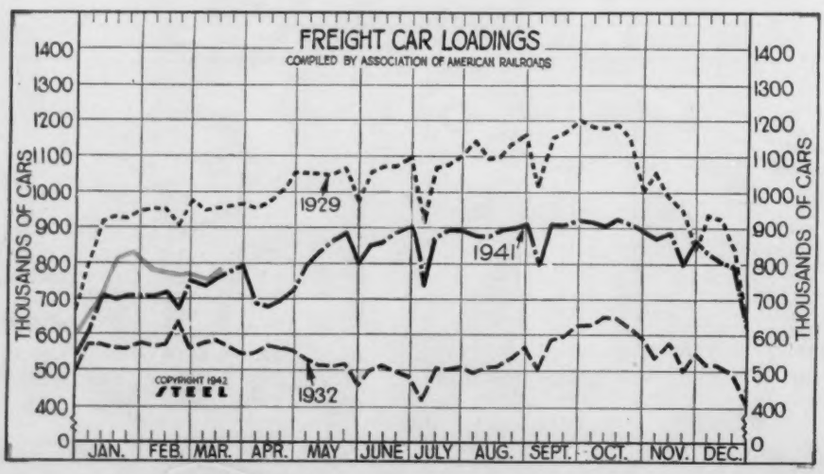
Week ended	1942	1941	1940	1939
Mar. 14	30.6	131.6	105.7	86.7
Mar. 7	24.5	125.9	103.6	84.1
Feb. 28	30.1	126.6	100.9	78.7
Feb. 21	25.7†	129.2	102.7	75.7
Feb. 14	29.8	127.5	95.1	79.9
Feb. 7	37.1	127.7	96.0	84.5
Jan. 31	73.3	124.4	101.2	79.4
Jan. 24	79.9	121.9	106.4	89.2
Jan. 17	75.0	124.0	108.5	90.2
Jan. 10	59.0	115.9	111.3	86.9
Jan. 3	18.5	76.7	87.5	76.7
Week ended	**1941**	**1940**	**1939**	**1938**
Dec. 27	24.6	81.3	89.4	75.2
Dec. 20	65.9	125.4	117.7	92.9
Dec. 13	96.0	125.6	118.4	102.9
Dec. 6	90.2	124.8	115.5	100.7
Nov. 29	93.5	128.8	93.6	97.8

†Canadian trucks and automobiles and United States trucks, since Feb. 21.

Freight Car Loadings

(1000 Cars)

Week ended	1942	1941	1940	1939
Mar. 14	799	759	619	595
Mar. 7	771	742	621	592
Feb. 28	781	757	634	599
Feb. 21	775	678	595	561
Feb. 14	783	721	608	580
Feb. 7	784	710	627	580
Jan. 31	816	714	657	577
Jan. 24	818	711	649	594
Jan. 17	811	703	646	590
Jan. 10	737	712	668	587
Jan. 3	674	614	592	581
Week ended	**1941**	**1940**	**1939**	**1938**
Dec. 27	607	545	550	500
Dec. 20	799	700	655	574
Dec. 13	807	736	681	606

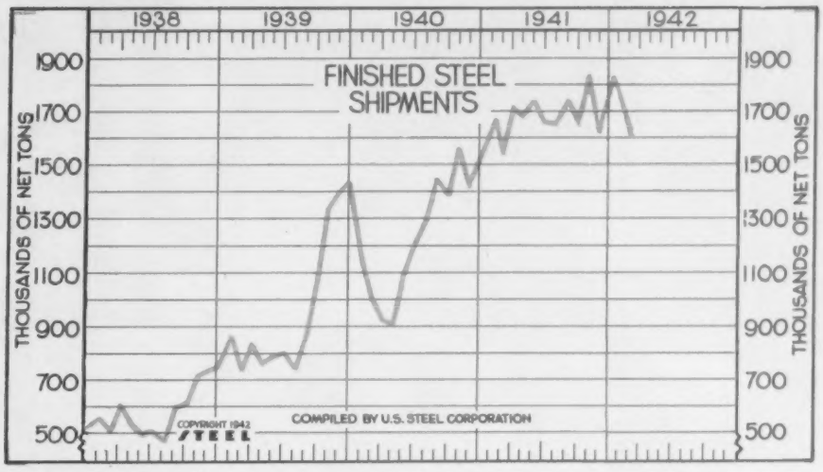


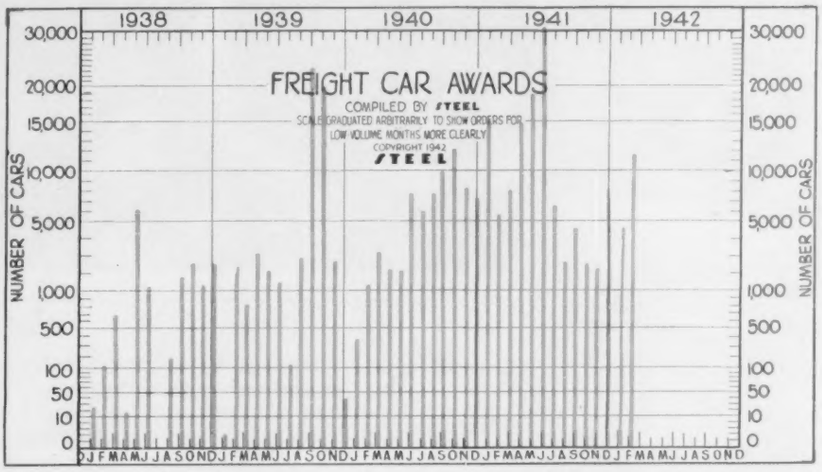
Finished Steel Shipments
U. S. Steel Corp.

(Unit 1000 Net Tons)

	1942	1941	1940	1939	1938
Jan...	1738.9	1682.5	1145.6	870.9	570.3
Feb...	1616.6	1548.5	1009.3	747.4	522.4
Mar...	.....	1720.4	931.9	845.1	627.0
Apr...	.....	1687.7	907.9	771.8	550.5
May..	.....	1745.3	1084.1	795.7	509.8
June .	.....	1668.6	1209.7	807.6	525.0
July..	.....	1666.7	1296.9	745.4	484.6
Aug..	.....	1753.7	1455.6	885.6	615.5
Sept..	.....	1664.2	1392.8	1086.7	635.6
Oct...	.....	1851.3	1572.4	1345.9	730.3
Nov..	.....	1624.2	1425.4	1406.2	749.3
Dec...	.....	1846.0	1544.6	1444.0	765.9
Tot.†	.....	.....	15,013.7	11707.3	7315.5

†After year-end adjustments.




1938
1939
1940
1941
1942
FREIGHT CAR AWARDS
COMPILED BY STEEL
SCALE GRADUATED ARBITRARILY TO SHOW ORDERS FOR LOW VOLUME MONTHS MORE CLEARLY
COPYRIGHT 1942 STEEL
NUMBER OF CARS
30,000
20,000
15,000
10,000
5,000
1,000
500
100
50
10
0
J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D J F M A M J J A S O N D

Freight Car Awards

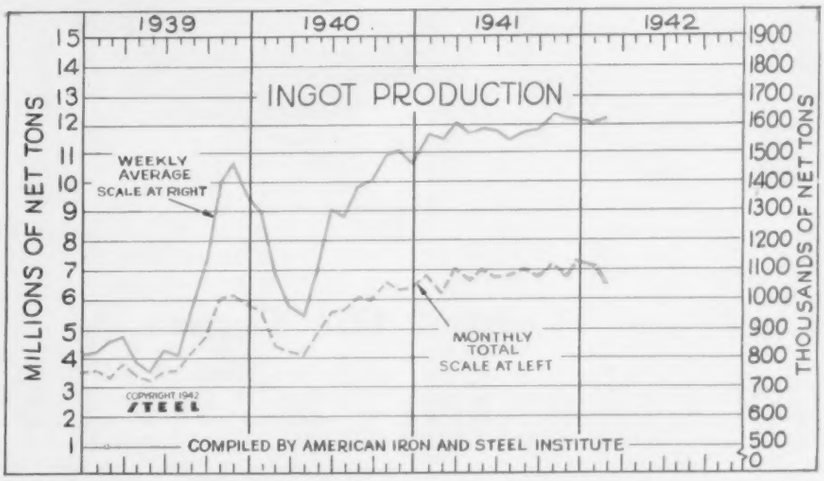
	1942	1941	1940	1939
Jan.....	4,253	15,169	360	3
Feb.	11,725	5,508	1,147	2,259
2 mos....	15,978	20,677	1,507	2,262
March....	.....	8,074	3,104	800
April.....	.....	14,645	2,077	3,095
May.....	.....	18,630	2,010	2,051
June	.....	32,749	7,475	1,324
July.....	.....	6,459	5,846	110
Aug.....	.....	2,668	7,525	2,814
Sept.....	.....	4,470	9,735	23,000
Oct.....	.....	2,499	12,195	19,634
Nov.....	.....	2,222	8,234	2,650
Total...	.....	121,499	66,889	57,775

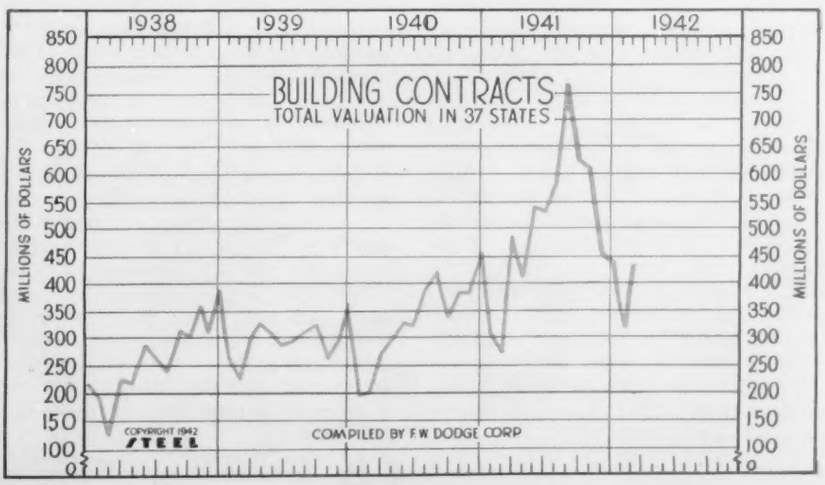
Steel Ingot Production

(Unit 100 Net Tons)

	Monthly Total		Weekly Average	
	1942	1941	1942	1941
Jan.	7,129.4	6,928.8	1,609.3	1,563.9
Feb.	6,525.1	6,237.9	1,631.3	1,559.5
Mar.	.....	7,131.6	.....	1,509.9
Apr.	.....	6,756.9	.....	1,575.0
May	.....	7,053.2	.....	1,592.2
June	.....	6,800.7	.....	1,585.3
July	.....	6,821.7	.....	1,543.4
Aug.	.....	7,001.0	.....	1,580.4
Sept.	.....	6,819.7	.....	1,593.4
Oct.	.....	7,242.7	.....	1,634.9
Nov.	.....	6,970.0	.....	1,624.7
Dec.	.....	7,164.0	.....	1,620.8
Total	.....	82,927.6	.....	1,590.5

†Weekly average.

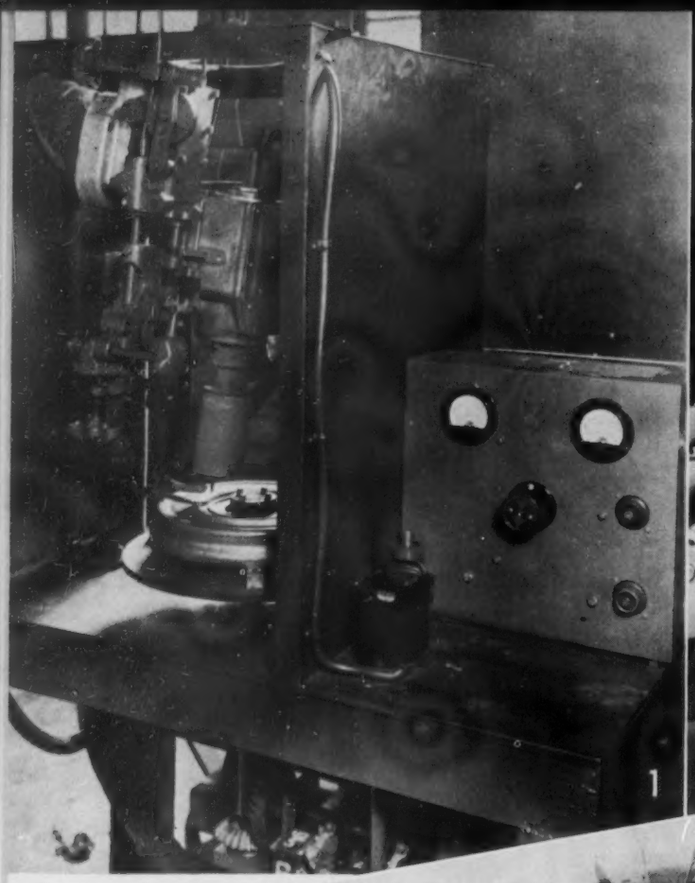


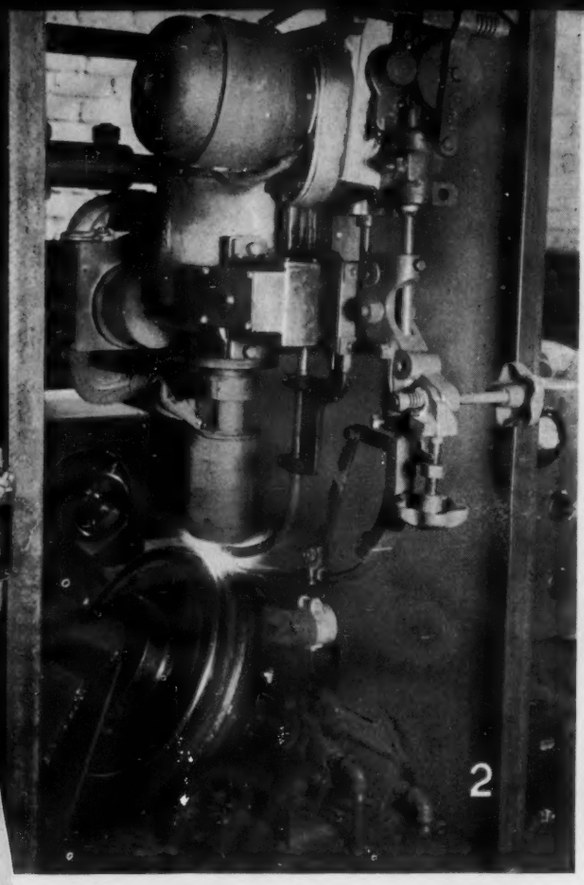


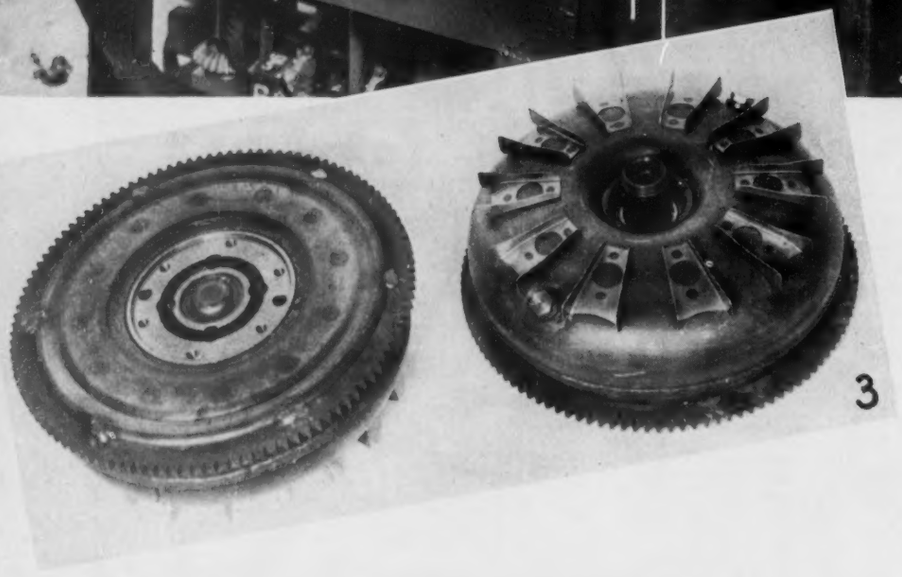
Construction Total Valuation In 37 States

(Unit: $1,000,000)

	1942	1941	1940	1939	1938
Jan. .	$316.8	$305.2	$196.2	$251.7	$192.2
Feb...	433.6	270.4	200.6	220.2	118.9
Mar...	.....	479.9	272.2	300.7	226.6
April.	.....	406.7	300.5	330.0	222.0
May..	.....	548.7	328.9	308.5	283.2
June .	.....	539.1	324.7	288.3	251.0
July..	.....	577.4	398.7	299.9	239.8
Aug..	.....	760.3	414.9	312.3	313.1
Sept..	.....	623.3	347.7	323.2	300.9
Oct...	.....	606.3	383.1	261.8	357.7
Nov..	.....	458.6	380.3	299.8	301.7
Dec...	.....	431.6	456.2	354.1	389.4
Ave...	.....	$500.6	$333.7	$295.9	$266.4







Clutches Welded Oil-Tight

AUTOMATICALLY

THE DESIGN of "fluid drive" clutches presents quite an engineering problem for the seams must be absolutely oil-tight and able to stand pressure up to 800 pounds per square inch. But technicians at the Long Mfg. Co., 12501 Dequindre street, Detroit, have worked out a method that not only does the job but does it automatically, assuring perfect work because all factors are duplicated correctly on each piece. **Fig. 3** shows two views of the clutch. One of the welded seams can be seen just above the gear on the right here.

In **Fig. 1** one of the clutches is set up in the "Electronic Tornado" automatic welding machine supplied by Lincoln Electric Co., 12818 Coit road, Cleveland. The inside seam is about to be welded. The clutch is revolved automatically at a constant rate of speed by means of the drive seen under the table in **Fig. 1.** The time required to weld this seam completely is 62 seconds. The large electromagnet seen just above the arc in **Fig. 3** controls the length of the carbon arc automatically. It can be seen entering the arc from the right in **Fig. 2.**

The first operation is to weld the outside runner to the flange, which is of 3/16-inch steel analyzing 0.35 to 0.45 per cent carbon, 0.15 sulphur and 0.90 manganese. The small inside diameter around the hub is then welded by hand because it was found to be more economical than to change the automatic setup. Next comes a test for leaks, employing air pressure applied while the assembly is under water.

The runners or fin assemblies which form the driving and driven members of the clutch are now placed in each of the shells. The driving assembly is welded to the shell, which is bolted to the flywheel. The other shell holds the driven member, which is free to move inside of this shell. After the driving and the driven members are fitted together, they are sent to the second automatic welding operation. In **Fig. 2** the arc has been struck and the circumferential weld begun. Welding time for this outside seam is 102 seconds.

This weld must not only act as a positive oil seal but must also be exceptionally strong because the oil pressure builds up to extremely high values in a car traveling 60 miles an hour.

Following this welding operation, the assembly is again tested with air while immersed in water to show up any leaks. If the unit is air tight, the starter gear, **Fig. 3,** is welded to the housing by hand using six tack welds. Then the units are balanced on a machine, weight being added where necessary. The completed clutch, filled with oil, weighs 47 pounds.

WPB Seeks To Save Metal In Heating Industry

Elimination of over 4500 kinds and sizes of pipes, ducts and fittings for warm air heating and air-conditioning is proposed in a simplification program recently submitted to the industry by the Division of Simplified Practice, National Bureau of Standards, Washington, at the request of the War Production Board.

The program, believed to be an entirely adequate range of fittings, lists only about 15 per cent of the gravity type furnace pipes and fittings, and only 19 per cent of the ducts and fittings for forced air heating and air conditioning currently offered. A substantial reduction also is proposed in registers and faces with which the fittings connect.

WPB initiated the proposal in order to conserve sheet metal and to release production facilities for war purposes.

Various manufacturers involved are being requested to review the program carefully which, if satisfactory, may become the basis for a government limitation order in the near future.

Manufacturers who have not already received a copy of the proposed recommendation are urged to communicate immediately with the Division of Simplified Practice, stating what tonnage of metal they normally consume per year in producing these products.

Castor Oil Now Speeds Cutting Operations

Cooler and faster cutting operations may be made with a new sulphurized cutting oil for high carbon steels developed by Pawling Refining Corp., Port Chester, N. Y. It also is claimed to be the only transparent sulphurized oil of this nature which enables the machine operator to see the cutting edge constantly.

Discovery of a new process by A. J. Paluszek, a company chemist, which permits complete distillation of castor oil and produces a castor concentrate with entirely new properties led to the development of the cutting oil.

Castor oil, prior to the chemist's discovery, was the one organic oil which destroyed itself by solidification within its boiling range. The new essences, produced under the new process, it is claimed have "active oiliness" which gives greater lubrication not found in other oils, the oiliness being responsible for the unusual properties in the new cutting oil.

According to the producer, this new basic material will absorb in solution much more sulphur than by using animal fats—the castor concentrate producing a clear sulphur compound rather than an opaque material.

Other products derived from this new process are: A new core oil of greater efficiency; a penetrating oil with greater penetrative ability; a castor oil industrial soap free of abrasives; cleaning compounds; wire drawing oil; lapping oil, roll oil for steel mills and others.

BUILDS ECONOMICAL SCRAP BREAKERS

. . . . from old rotary pumps and welded structural sections

National Steel Car Corp., Hamilton, Ont., Canada, produces shell for the British government on a large scale. Tons of long spiral-shaped cuttings come from the lathes each day. But these cuttings are so bulky that scrap dealers will accept them only if they are broken into small pieces—and breaking them appeared a tough job indeed.

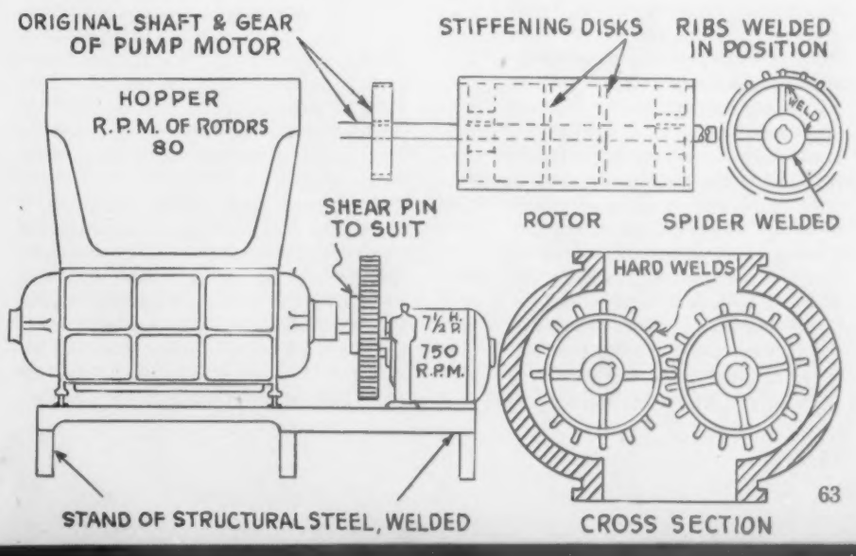
By experimentation, it was found that these cuttings, due to their high carbon content, could be broken when bent at a 45-degree angle. Breaking could be accomplished by running the cuttings through gears.

Since no suitable scrap breaker could be found, the company decided to make its own. A discarded rotary pump, bought at a low price at a local scrap yard, was converted into the main unit of the home-built scrap breaker.

For changeover from pump to breaker, the rotors were replaced with gears made of standard 10-inch pipe 36 inches long with 1 x ½ x 36-inch bars welded around the outside to form the teeth. See illustrations. A hard-surfacing bead was then applied to each tooth top to prevent excessive wear. Two 10-inch disks with 6-inch holes were welded 14 inches from each end for stiffeners. Hubs were made from 6-inch round steel 4 inches long with a keyed hole to fit the shaft which had been removed from the pump rotor. Hubs were held in place by four pieces of 2 x 4 x ½-inch mild steel welded together as shown in the drawing.

The hopper to feed the breaker was constructed of ¼-inch plate arc welded together and bolted to the top of the pump housing. Breaker was mounted on an angle-iron frame about 18 inches high so that broken cuttings could be shoveled out easily from underneath it. Scrap breaker was driven by a 7½-horsepower motor, which had been geared down to 80 revolutions per minute.

This machine proved so successful, according to Harry F. Graham, company engineer, that three more were made. The largest of these three additional scrap breakers had gears 22 x 84 inches and stood 8 feet high. Arc welding made it possible to easily convert these old rotary pumps into efficient, economical scrap breakers. Welding equipment was furnished by the Hobart Brothers Co. located at Troy, O.



Left, side view of discarded rotary pump converted to scrap breaker. Upper right, rotor made from 10-inch standard pipe. Ribs made from bar stock are evenly spaced. Spider also welded construction, keyed to shaft. Lower right, cross section through pump housing and welded breaker gear

CONVERTS

Auto-Body Plant

By HERBERT CHASE

. . . . to production of wing sections and other aircraft parts by adapting double-acting crank presses to form parts previously made only on drop hammers. Except for trimming, parts are produced complete at one stroke of the press. Several unusual types of dies made from low-melting alloy and even from fiber are developed

In the accompanying article is a description of forming methods which promise to be an effective compromise between those originated in aircraft plants and those in auto body plants. It demonstrates that aircraft parts can be deep drawn on double-acting crank presses to produce a better appearing and more accurately sized product. . . .and the work can be turned out at a rapid rate with moderate labor costs. With the urgent demand for war production, especially of aircraft, these are important accomplishments which can well be utilized by others having similar production problems.

Possibly of equal importance, is this demonstration of how a little ingenuity and resourcefulness can result in converting important production facilities directly to war work. . . .using the same equipment and with the same workmen. Have you surveyed your plant facilities to see to what portion of our war production you can contribute?

ONE OF THE most important phases of the conversion of industrial capacity to war production is taking place in Detroit where the huge facilities of the nation's automobile builders are being converted for the production of war goods. Typical of the ingenuity and resourcefulness with which this task is being attacked is the case of Murray Corp. of America, Detroit. Formerly devoted to making automobile bodies, it now has successfully been converted into one of the important sources of wing sections and other portions of *Flying Fortress* planes.

As in any conversion program, it is highly desirable to adapt existing equipment and facilities to war production as far as possible for new equipment is not only costly but extremely difficult or impossible to obtain. Too, the added delay in obtaining it means a longer time before full production can be reached. Thus one of the important problems at Murray was how to adapt the large double-acting crank presses to aircraft work—work usually accomplished on drop hammers in the press departments of aircraft manufacturers. The answer was found largely in the solution of the die problem. How it was solved effectively is a good portion of the conversion story in this plant.

Although drop-hammer work has been developed by aircraft plants so as to yield parts which meet requirements, the process is rather slow and the products turned out are not easily held within the dimensional limits commonly attained in drawing sheet steel in dies such as are used for automobile bodies. Work already done in the Murray plant, especially in double-acting crank presses, has shown that high-grade drawn parts for aircraft can be produced on these presses and that the work can be held within closer dimensional limits (besides being smoother) than the usual drop-hammer product.

The number of duplicate parts required in aircraft work is so small as compared with that always required for large-scale automobile-body production that it is not feasible to use cast iron or steel dies of the same type used for auto bodies even if such dies were suited for the aircraft parts. It has been necessary, therefore, to find or develop ways of making less expen-

Fig. 1—One of many zinc alloy dies (Kirksite) now being used successfully for deep drawing aircraft parts in double-acting crank presses is shown here. Both die and punch as well as pressure ring are cast close to finished dimensions

Fig. 2—Experimental dies such as this one made of hardwood and faced with Cerrobend are used successfully in the double-acting crank presses for making aircraft parts. A part produced by these dies is shown

Fig. 3—In the Artz press shown here sheet metal is stretched tightly over convex forms or dies of hardwood or of wood covered with Cerrobend alloy. Then concave portions of the part are formed by hand using rubber hammers or by hammering on wood block. Some parts so formed are shown. Arched sheet is held in clamps while form is elevated by hydraulic ram. This method is used only until dies for the double-acting crank presses are available, the presses then being used to make the part

Fig. 4—Hydraulic press forms relatively flat and shallow parts by the Guerin process using a universal female die consisting of a rubber pad fastened to the press ram. Dies placed on carrier and rolled under ram from four different sides in rapid succession, keeping press fully occupied

sive dies and at the same time to use materials which will not scratch the aluminum alloy sheet.

As far as die materials are concerned, dies developed at Murray are similar to or identical with those found in aircraft plants, including those employed in drop-hammer work. But the dies have been adapted for use in presses which do drawing (especially those of the double-acting type) as distinct from the hammering commonly employed in making aircraft parts of large size.

Of necessity, the dies must be low in cost yet capable of use for fairly long runs. Unfortunately, however, most runs are short, not only because the number of parts required is limited but also because the sheet materials used are not available in sufficient volume to make the total number of stampings required at one time and then to store them for gradual use as assemblies are built up. In consequence, runs are often made of perhaps no more than a dozen pieces at a time. The saving comes in labor, which is far less than in drop-hammer work, especially as pieces made in the drop hammer often require much supplementary hand work to remove wrinkles before parts are produced of satisfactory smoothness. Parts made in double-acting presses are completed, except for trimming, in a single stroke of the press. In addition, the time required for setting up the dies is relatively short.

Most of the dies for deep drawing are cast from a zinc alloy such as Kirksite (also extensively used in aircraft plants) which has adequate hardness and strength. See Fig. 1. This material is cast quite close to the required size so generally the working surfaces have only to be smoothed and bedded-in to make the dies ready for use. There is no Kellering and little or no other machining needed. The smoothing of the working surfaces is done with abrasive or scraping tools.

Both die and punch are made from

Fig. 5—Dies made from vulcanized fiber, some of them 6 feet long, are mounted on steel backing plates and used successfully in forming by the Guerin process. Formed stampings are seen over two of the dies here. At the left is a templet used in making one of the dies

Fig. 6—One of the dry-ice boxes in which aluminum alloy sheet stock is kept cold to prevent age hardening while being transferred to forming presses so sheet can be formed while still near zero Fahr.

the zinc alloy which can be remelted and reused for making new dies when a given set of dies has served its purpose. The pressure ring (which grips the edges of the blank) is usually cast from the same alloy, but in some cases cast iron is employed as the flanged portion of the sheet gripped by it is subsequently cut off so scratches on that portion of the work are not of any consequence.

The procedure in making these drawing dies is as follows: First, a hardwood model of the part is made. Second, a plaster cast is produced from the wood model. Third, the model is used as a pattern in a sand mold to cast the die. Finally, the cast punch and die are bedded and relieved for metal thickness and are ready for use. A pattern is also made for the pressure ring. This pattern is used in a sand mold for casting the ring which is later bedded to fit the die. Some of the dies made in this manner are shown in accompanying illustrations.

Also suitable for making dies for drawing dural sheet in double-acting crank presses is a method that involves building the dies from hardwood and then facing them with a Cerrobend, a bismuth alloy. With a low melting point of only 160 degrees Fahr., this metal can be cast in contact with the wood without injuring the wood. Although this is a soft metal, it is expected to meet the requirements for at least short runs and, if injured in service, can easily be removed. Such a die is shown in Fig. 2.

Some parts are also being made by the Guerin process in hydraulic presses, following, in general, the methods developed in aircraft plants, although with some minor modifications in certain types of parts. While getting into production, some use is also being made of an Artz press or metal stretching machine, similar to those used in aircraft plants. Such presses have long been used in making model bodies and other development work in body plants and are being used by Murray only to make small quantities of aircraft parts to meet immediate assembly requirements pending the completion of dies for use in stamping presses.

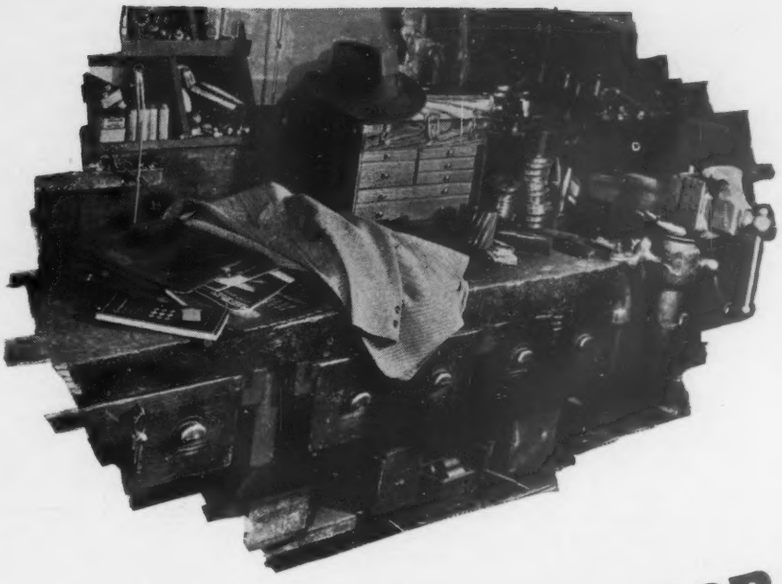
A single half-die or punch, cast against hardwood in the manner last described above is also employed in an Artz press as a form over which a sheet is stretched in making certain parts as a preliminary to regular production later in drawing dies. In the Artz press, Fig. 3, the edges of the dural sheet are clamped to steel sheets which, in turn, are gripped in fixed clamping heads forming a part of the press, the dural sheet being arched over the wood form faced with Cerroband. Then the form is elevated by the hydraulic ram of the press, stretching the metal tightly over the form.

Such stretching causes the sheet to take the shape of convex portions of the form but, of course, leaves the sheet bridging over depressions of the form if any are present. At such depressions, the metal is hammered into the recesses by hand, using rubber hammers and wooden blocks which stretch but do not scratch the metal. The method will produce well-shaped pieces when done by skillful metal workers, but the process is, of course, much slower than production in a drawing press.

Production by the Guerin method on hydraulic presses follows, except for some details in die construction, about the same methods used in Douglas and other aircraft plants. The ram or upper platen of the press is equipped with a thick rubber pad confined along the edges by a cast metal holder, the pad then serving as a universal female die. The other half of the die set (the male portion) is laid on a metal carrier which, when the press closes, is supported on the bed or lower platen of the press. Pressure of the confined rubber against the sheet metal to be formed causes it to conform to the shape of the die. See Fig. 4. The press is equipped with carriers or tables which are rolled out on each of the four sides for unloading and reloading while one is under the ram. The carriers are advanced under the ram in rotation, thus greatly increasing the volume of work which the press can turn out.

Dies employed in the Guerin process in the Murray plant are made in most cases from vulcanized fiber sheets or slabs usually from 1¼ to 2 inches in thickness. Construction of these dies is done in the model shop of the plant, using chiefly woodworking tools. If the die requires considerable depth, slabs of fiber are built up to the required height and are fastened to a steel plate to avoid possible warpage. This applies especially to large dies, some of which are 6 feet or more in length and may be 6 inches in depth. Some such dies are shown in Fig. 5.

Some dies used in the Guerin process have undercuts or are required to form rather deep flanges. Where the latter come at inside radii, there is a tendency for the metal to wrinkle. But such wrinkling can often be avoided if the flange is not turned down for the full depth. Instead, a step is employed which can be made from a separate piece of fiber fastened to the same plate as the main portion. The flange is thus formed smooth for, say, half its required depth with the remaining metal turned outward parallel to the top face to give a returned bend. Subsequently, this outwardly turned portion can be hammered down by hand. Although some wrinkles may be formed in so doing, they extend for



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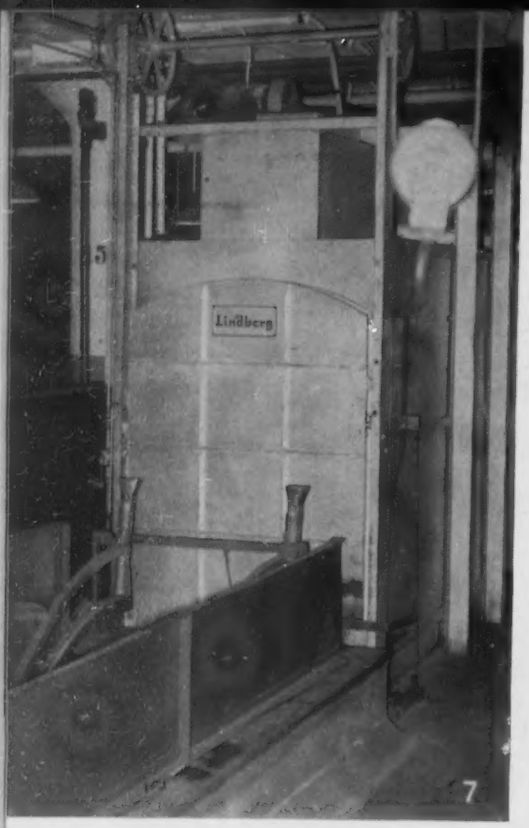


Fig. 7—Electric furnace and part of quench tank for heat treating aluminum sheet stock and blanks. Upon heating to temperature for required period, work and carrier are rolled down track into quench. When cool, work is transferred immediately to ice-boxes (Fig. 6) in order to prevent age hardening

only half the depth of the flange required and are more easily removed than if the upper part of the flange were wrinkled also, as would be the case if the stepped die were not used.

Thus several types of dies quite different from those used in automobile body work are being used successfully in the converted plant. For most of the new work the same double-acting presses used for body work are employed. Dies are commonly tried initially with deep-drawing steel of the same thickness as the dural to be used subsequently. This practice avoids waste of dural stock as far as possible.

Something of an innovation is employed in this plant in the handling of the aluminum alloy sheet before it is used for forming. In early attempts at forming the sheet (which, of course, is purchased to Air Corps specifications), much trouble was encountered with the sheet tearing during or subsequent to forming. It was also found that the subsequent heat treatment caused formed pieces to go out of shape and that restriking them in the die in which they were formed did not yield satisfactory results.

It was concluded that heat treatment should precede forming. Age hardening between heat treatment and forming operations is prevented or greatly delayed by keeping the stock at or about zero Fahr. after heat treatment. So it was decided to build portable dry-ice boxes in which the sheet could be stored immediately after heat treatment and transported to the presses for forming while still cold. The boxes, Fig. 6, have double walls of wood, between which is granulated cork insulation. A slat shelf is at the top for the dry ice. By mounting the boxes on casters, it is possible to transport them readily from the heat-treating department to the presses so the stock is still near zero Fahr. when placed in the die for forming or drawing. As a result the material is soft when drawn and so does not split or crack or require heat treatment subsequent to drawing. Boxes are some 7 feet high, about 3½ feet wide and 6 feet from front to back, inside, so they can hold many large sheets if required.

Heat treatment of the aluminum alloy sheet stock or blanks is done in an electric oven in which the temperature is automatically controlled. Material to be heat treated is placed in a wheeled carrier which is rolled into one end of the oven. After being heated to the required temperature for the specified time, the carrier with its charge is rolled out at the other end of the oven and into a tank of cold water below floor level. When cool, the carrier is picked up by an electric trolley hoist and set on the floor where the charge can be transferred quickly to the ice boxes in which the material is stored until required at the presses.

SUBSTITUTES

For Zinc Coatings

VARIOUS substitutes for zinc as coatings of steel have been suggested by a committee of metallurgists selected from the technical committees of the American Iron and Steel Institute. This group met at the request of the committee on manufacturing problems of the institute. The following is from their report.

Substitutions considered were lead base coatings; nonmetallic inorganic coatings; organic coatings. Such substitutes for zinc as aluminum, copper, nickel, chromium, tin, etc., can not be recommended due to their scarcity.

Lead has many desirable features as a coating metal and, as long as sufficient supplies are available, it can be adapted for certain purposes. Obviously, lead coatings cannot be substituted indiscriminately for zinc. They can be used readily on wire, may have some application to sheets, but seem to have limited possibilities, if any, for pipe.

Some work has been done with a coating metal containing 4 per cent tin, 2 per cent zinc, 1 per cent antimony, and 93 per cent lead. The metal has been used successfully for coating small hardware which can be centrifuged to remove excess metal. Coatings produced are extremely light. Proponents of the alloy are investigating the possibility of using the metal for the machine coating of sheets. Most satisfactory results are obtained by employing coating temperatures between 750 and 800 degrees Fahr.

Another alloy analyzing about 94 per cent lead, 3.5 per cent antimony, and 2.4 per cent tin, with small amounts of bismuth and arsenic, is claimed to produce excellent results when applied as an extremely light coating to small hardware and pipe as well as a heavy coating to various products formed from sheets. Coating temperatures around 600 degrees Fahr. are used. A molten salt cleaning bath appears essential when applying this coating metal.

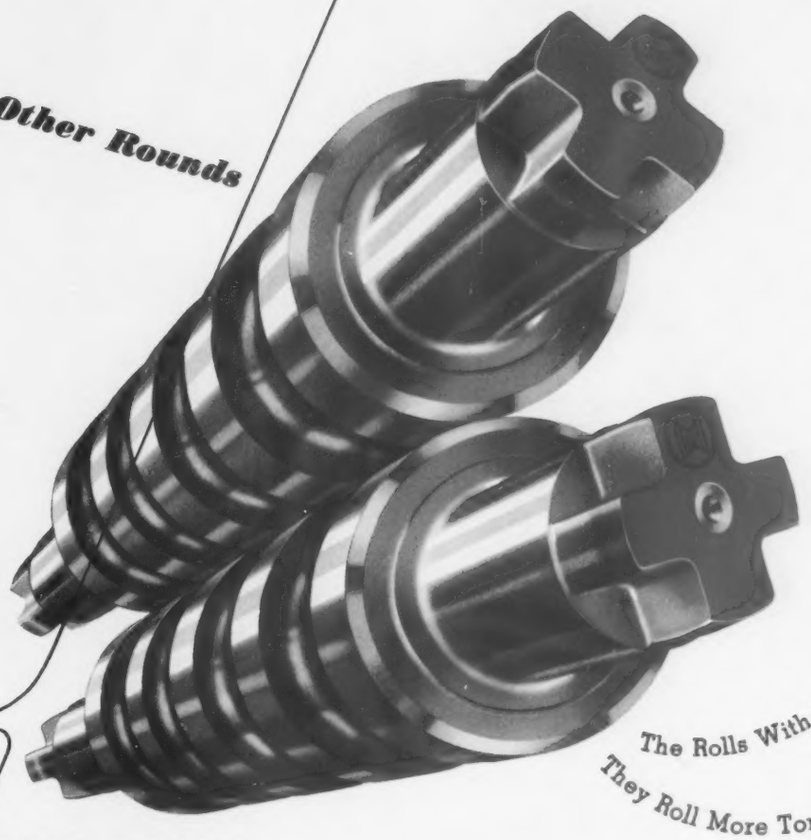
Of the nonmetallic inorganic coatings, cement linings appear useful as a substitute for galvanized pipe in many places. Oxide coatings offer but little protection from rust.

Phosphate coatings have been used on steel for many years, but these alone afford little protection against corrosion unless they are covered with oil or paint. One phosphate treatment called bonderizing is used extensively as a pretreatment of steel prior to painting such articles as automobile bodies and window sash. While phosphate treatment promotes the durability of the painted or enameled article, the corrosion resistance of the article as normally finished is not comparable with galvanized material.

The usual type of phosphate coating will flake from steel on forming or bending. Therefore it must be applied after the article has been

(*Please turn to Page* 76)

For Rolling Shell and Other Rounds



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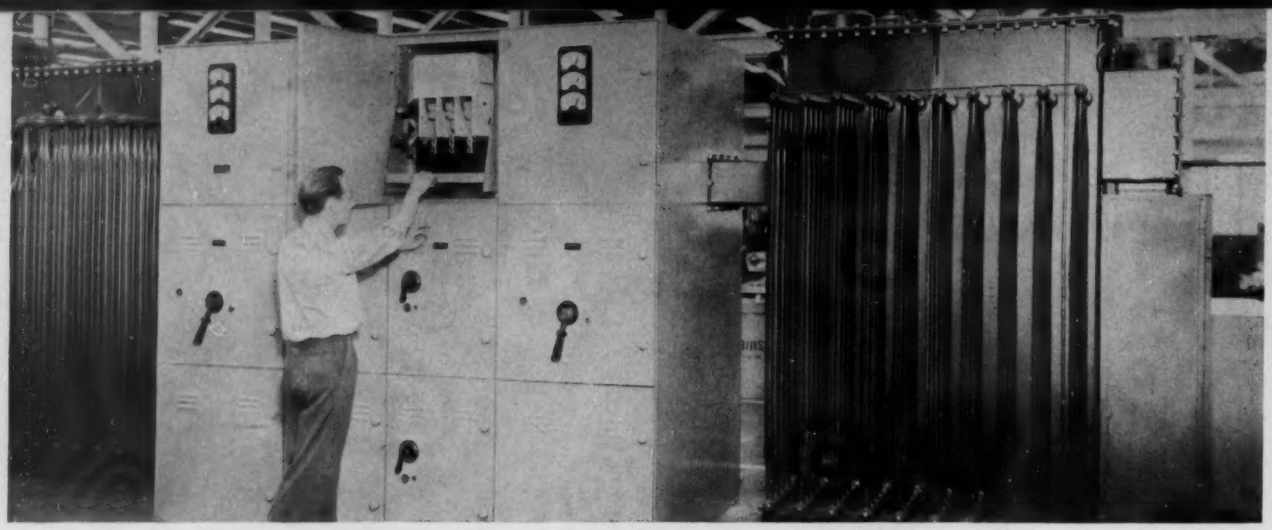


Fig. 1—Use of Pyranol instead of oil further reduces size of this load-center substation installed in an ordnance plant. Unit is rated 1200-kilovolt-amperes, employs easily removable draw-out type secondary air circuit breakers

LOAD-CENTER POWER DISTRIBUTION

. . . . an important system improvement that eliminates the high cost of excessive voltage drop in long, heavy, low-voltage circuits; reduces copper requirements; makes flexible layout possible

ANY IMPROVEMENT in electric power distribution systems is doubly important at this time because not only must every possible means be taken to keep machine production at highest efficiency by eliminating excessive voltage drops, but equally important is the saving possible in copper where new lines or a new system must be installed to take care of new plants or additional facilities. Since load-center power distribution cuts line losses, saves tremendous amounts of copper and costs considerably less to design and install as well as allows better performance of equipment served, this type of distribution system is being widely utilized in many new war plants and in the extension of existing facilities.

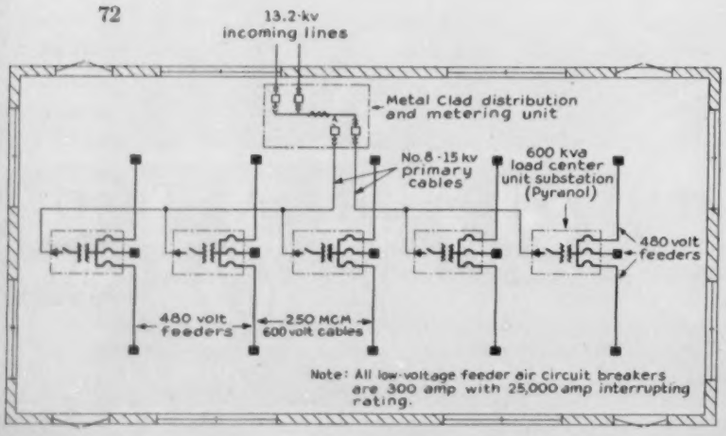
Estimates show 5,000,000 pounds of copper and steel could be diverted to other vital production requirements if this system were applied to all expansions proposed and under way for 1942, according to engineers of the General Electric Co. who recently described the system in a paper presented to the American Institute of Electrical Engineers. Speedier installation would also allow plants to get under way faster.

What Is Load-Center Power Distribution? The system primarily provides for distributing high voltage to a number of load centers as shown in Fig. 2, where five such centers are served by high-voltage lines. From there on the power is distributed to the load by means of short secondary feeders. This eliminates in one step the long secondary feeders which exist under the conventional radial distribution diagrammed in Fig. 3.

To visualize the difference between these two forms of power distribution systems, consider a typical medium-sized factory with a demand of 3000 kilovolt-amperes, a load density of 10 volt-amperes per square foot of floor area and supplied with power from two 13.2-kilovolt lines. Secondary distribution is at 480 volts. Building is assumed to be 400 feet wide, 750 feet long. Both the load-center system, Fig.

Fig. 2—(Left below)—Line diagram showing arrangement of circuits in a typical medium sized plant employing the load-center system of electric power distribution. Note the five substations served by high-voltage primary cables

Fig. 3—(Right)—Simplified line diagram of same plant as in Fig. 2 but here using the conventional radial system of electric power distribution. The much greater amount of heavy secondary cable needed is clearly evident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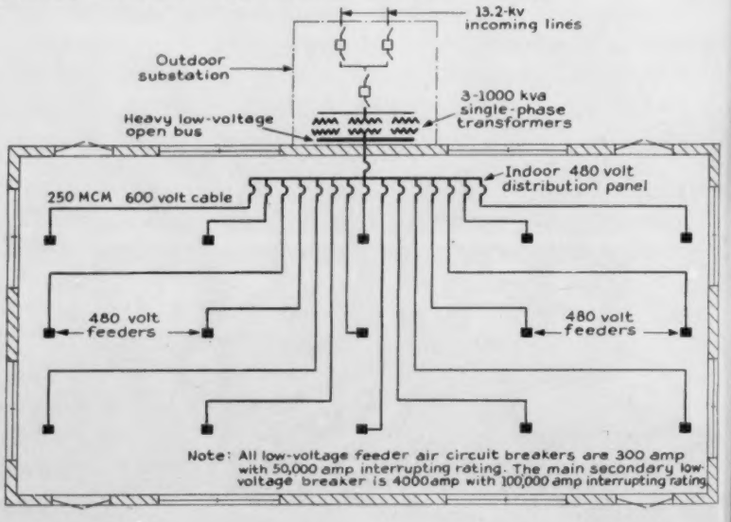
No.8-15 kv primary cables
600 kva load center unit substation (Pyranol)
480 volt feeders
480 volt feeders
250 MCM 600 volt cables
Note: All low-voltage feeder air circuit breakers are 300 amp with 25,000 amp interrupting rating.


13.2-kv incoming lines
Outdoor substation
Heavy low-voltage open bus
3-1000 kva single-phase transformers
Indoor 480 volt distribution panel
250 MCM 600 volt cable
480 volt feeders
480 volt feeders
Note: All low-voltage feeder air circuit breakers are 300 amp with 50,000 amp interrupting rating. The main secondary low-voltage breaker is 4000 amp with 100,000 amp interrupting rating.

ZINC IN WAR

16 FUZE PLUGS EVERY 12 SECONDS!

Any fabrication process which is capable of turning out 16 semi-finished metal parts every 12 seconds is geared to war production. That is why the die casting industry is now taking on the production of direct and indirect implements of war. That is why zinc alloy must be available in sufficient quantities to enable the die casting industry to make an all-out war effort.

Zinc alloy is the most widely used metal in die casting because, with the selection of the most appropriate alloy, it enables the production of castings having four outstanding characteristics: *Accuracy*—close tolerances can be achieved and maintained throughout the useful life of a casting; *Complexity*—intricate shapes are obtained to incorporate many features in a single part, thereby eliminating much machining and assembling; *Strength*—zinc alloy die castings have higher shock resistance than most other cast materials; *Economy*—all of the foregoing factors, plus long die life and low metal cost, add up to impressive production economies.

The die casting industry is doing a war production job (as typified by the shell fuze plugs shown in the background) and the zinc is there as needed. But this represents one more reason why it will be difficult for civilian users to obtain all of the zinc they would like to use.

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New Jersey Zinc

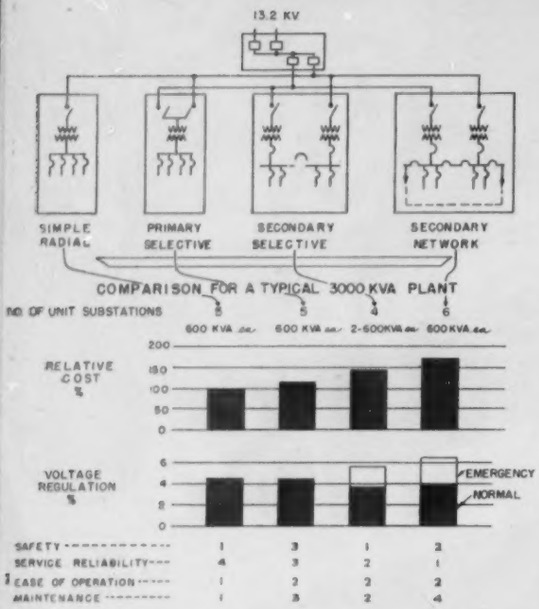


Fig. 4—Four basic circuit arrangements of load-center distribution, including a comparison of relative cost, voltage regulation, safety, service reliability, ease of operation and maintenance for a typical 3000-kilovolt-ampere plant. Note secondary network system is rated first as to reliability, next best as to safety, ease of operation

TABLE I—Savings in Material with Load-Center Distribution

	Steel	Copper	Others	Total
Apparatus	4,800	400	—1,200	4,000
Cable	3,000	11,100	2,500	16,600
Total	7,800 lb.	11,500 lb.	1,300 lb.	20,600 lb.

TABLE II—Savings in Cost with Load-Center Distribution

	Old	Load Center	Load Center Savings
Primary Switchgear	$12,000	$13,100	—$1,100
Substations	34,400	27,500	6,900
*Cable	10,100	3,900	6,200
	$56,500	$44,500	$12,000 or 21 per cent

*Includes primary cable.

2, and the radial system, Fig. 3, are designed to give comparable service continuity.

Saving in Copper: Because low-voltage feeder runs are short, there is a tremendous saving in copper, also some saving in steel. Table I itemizes these savings for our example.

Lower Costs: Shorter low-voltage feeder lines mean lower cost of secondary cable. There also is a saving in substation costs because the smaller transformers have less secondary short circuit current and thus smaller secondary feeder breakers can be used. Instead of an outdoor switching station, a small compact indoor metalclad structure is satisfactory and also reduces the cost.

Table II breaks down the total saving of 21 per cent for the particular example. While savings for small plants would be less, the percentage of saving would run approximately the same. Savings become greater for larger plants.

Reduced Engineering Expense: Because the substations of load-center distribution systems are small, they can be added when and where needed without extensive planning and forecasting. With a radial system, extensive forecasting of locations and magnitudes of loads is required in order to select the most advantageous location for the large substation.

Furthermore, small substations can be built and wired completely in a factory on a production line and thus arrive at the site ready for operation since it only is necessary to bolt one or two sections together and connect to the line. Compare this with older methods in which detailed drawings are required for the assembly of the component piecemeal parts. This conservation of time and manpower is vitally important in the present war program.

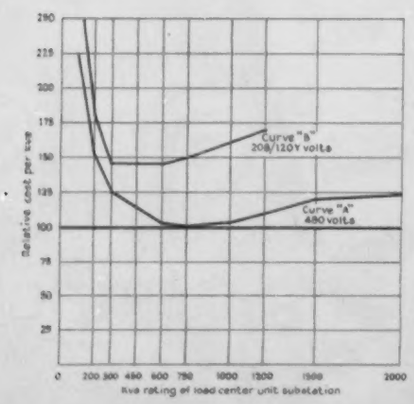
Only a simple functional specification is required for buying unit substations. No longer is it necessary to furnish a complete specification for every part. The saving in time and effort in preparing specifications is evident.

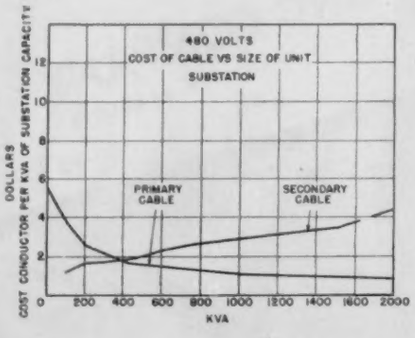
Better Performance of Equipment Served: With the load-center system, line voltage drop is less. This means line voltage is held at a much more uniform value so there is less light flicker and all motorized equipment operates at maximum efficiency. Often this can mean an important increase in production.

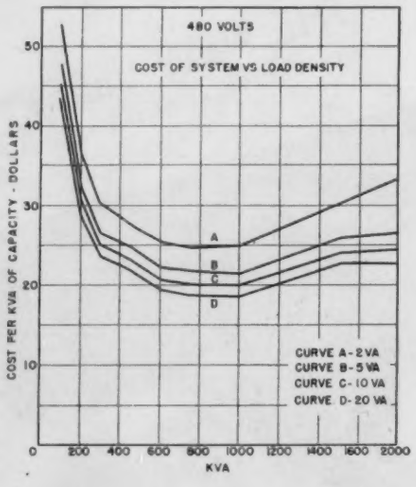
It is easier to finance load-center distribution systems since the small units can be added as the load grows; hence only moderate outlays of capital are required at any given time. The salvage value of load-center equipment is high because it is built as a unit and so can be moved bodily from one location to another, where it can be utilized 100 per cent.

This extreme flexibility is one of the major advantages of the new system. Equally important is that it assures service continuity since individual secondary networks can be installed for important production lines or equipment which must operate without interruption even though disturbances occur in other

Fig. 5—(Left below)—Curves showing how size of the load-center unit substation influences its cost per kilovolt-ampere. Also shows relative costs of 480-volt secondary system as against 208/120-volt secondary. Fig. 6—(Center)—Cable size plotted as a function of transformer size (substation capacity). All illustrations furnished by General Electric Co., Schenectady, N. Y. Fig. 7—(Right)—These curves show effect of load density and substation size on the cost of the system per kilovolt-amperes of capacity. Load densities from 2 to 20 volt-amperes per square foot of floor area include practically all ranges encountered in ordinary industrial plants







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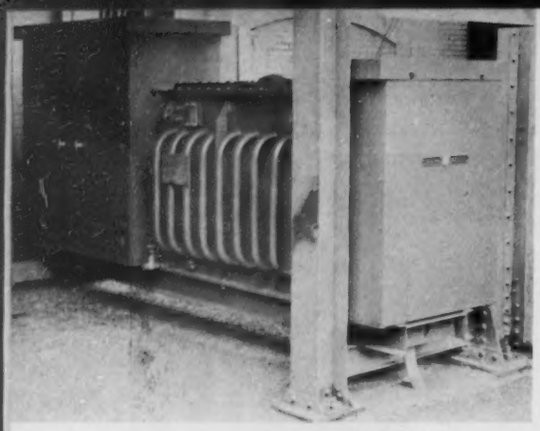

Fig. 8—Even in outdoor installations, compactness is desirable. This is a 150-kilovolt-ampere load-center unit substation. General Electric equipment

portions of the plant service system.

Optimum Size of Unit Substation: This is determined principally by the cost of the unit substation itself. Smaller load-center units are more expensive because small equipment inherently costs more per kilovolt-ampere. Larger load-center units become increasingly expensive because of the larger fixture needed to handle the higher short-circuit currents accompanying large transformer banks. Optimum size of transformers lies between 600 and 1000 kilovolt-amperes for 480-volt secondaries, although 1200 to 1500-kilovolt-ampere units may come within the limit of most economical sizes in certain cases. See curves in Fig. 5.

Cable cost also enters. For smaller units, more primary but less secondary cable is required and vice versa. However, there is an important increase in the amount of secondary cable necessary to transmit the power over the larger load area. Fig. 6 shows how cable cost varies with size of the unit substation. Note that the curve for the primary cable goes down with increasing size of substation, while the secondary cable curve goes up, the two crossing at a substation size of 400 kilovolt-amperes.

Load density too affects the overall system cost, principally because of the effects on cable cost. The total installed cost per kilovolt-ampere of load-center distribution for load densities from 2 to 20 volt-amperes per square foot of floor area is shown in Fig. 1. Within these limits, the load density does not affect the economical limit shown in Fig. 5. This range of load density will cover most factory installations.

Curves in Figs. 6 and 7 are based on secondary voltage of 480 volts. When lower voltage secondaries are used, the cost per kilovolt-ampere of the system is higher because of the greater amount of secondary cable and copper required and because of the increased cost of secondary switchgear. The two curves in Fig. 5 furnish a comparison. As can be seen here, the most economical size of transformers for 240-volt or 120/208-volt circuits is between 300 and 600 kilovolt-amperes.

Load-center distribution systems lend themselves particularly well to circuit arrangements which minimize or entirely eliminate service outages. This is an important factor as it reduces possibility of production stoppage or delay from accidents or deliberate efforts at sabotage.

Referring to Fig. 4, four basic circuit arrangements of load-center distribution are compared. *Primary* selective sources provides two sources of power, thus making available an alternate source should a failure occur on one primary feeder. Outage time is limited to that period needed to switch over connections.

Secondary selective circuit arrangement offers greatest promise since it extends the duplication of supply to the low-tension bus, thus providing for continued service with either a transformer or a primary feeder out. Service reliability is extremely high, especially when the tie breaker is operated electrically, accomplishing an automatic transfer.

Secondary network system affords most reliable service of all for here load-center units are interconnected permanently by low-tension tie circuits. Thus emergency power can be obtained from adjacent load

(*Please turn to Page* 107)

Coating Substitutes

(*Continued from Page* 68)

fabricated. However, a new process has recently been developed which produces a thin phosphate coating that will not flake away from the steel on forming. This light-weight coating seems to afford insufficient protection against rusting and, so far, its only application has been for tin-mill black plate that is to be enameled or lacquered.

Vitreous enamel coatings may prove desirable substitutes for zinc coatings on certain applications, but at present their cost and lack of formability restrict their application.

Combination zinc and phosphate coatings appear most promising—a thin electrolytic coat of zinc being followed by one or more coats of paint after the phosphate treatment. Zinc has notoriously poor paint-holding characteristics so must be chemically treated prior to painting, unless a special primer containing zinc dust and zinc oxide is used. A number of steel mills are equipped to phosphate treat zinc-coated steel, and the phosphate coating so produced does not flake away on forming and serves to prevent peeling of the paint from the zinc. It is probable that a layer of electroplated zinc of the order of 0.1-ounce per square foot (possibly less), phosphate treated and subsequently painted, is a good emergency substitute for standard galvanizing of sheet steel.

Long-time service tests on steel lightly coated with zinc, phosphate-treated and then painted are not available, and it is therefore impossible to predict just how satisfactory such a material will be for different services. Experience with somewhat heavier coatings and the known ability of even an extremely thin coating of zinc to prevent rusting of the underlying steel would indicate that the suggested method has possible merit as a substitute for heavier zinc coatings.

The zinc-coated and phosphate-treated material as it leaves the mill is suitable for painting. Shipping, warehousing and fabrication usually make it necessary to clean the surface thoroughly before painting. A spray alkali cleaner, a vapor degreaser or a solvent wipe are satisfactory methods of cleaning. It is recommended that the manufacturer of the sheet be consulted regarding suitable methods of cleaning.

Consideration of organic coatings was accompanied by recommendations for surface preparation, including the light metallic treatments, chemical treatments and non-treatment. The first-named covers:

Flash Zinc Treatment: A flash coating consists of electrodeposited zinc 0.0001 to 0.00001-inch in thickness on each side of the sheet and hot dipping in a balanced aqueous phosphate solution containing an activating agent. This type of surface treatment will resist white rusting or discoloration in storage and allows the sheets to be shipped and warehoused before painting, if so desired. It also furnishes a surface that will give excellent paint adhesion.

Flash Terne Treatment: A light hot-dipped coating of terne metal, coated to a weight of 4 to 6 pounds per double base box—i.e., 112 sheets of 20 x 28 inches or equivalent—is used, preferably applied to cold-reduced metal base sheets, thereby minimizing porosity of the coating. This type of surface treatment is within itself an excellent surface for painting and can be shipped and

(*Please turn to Page* 98)

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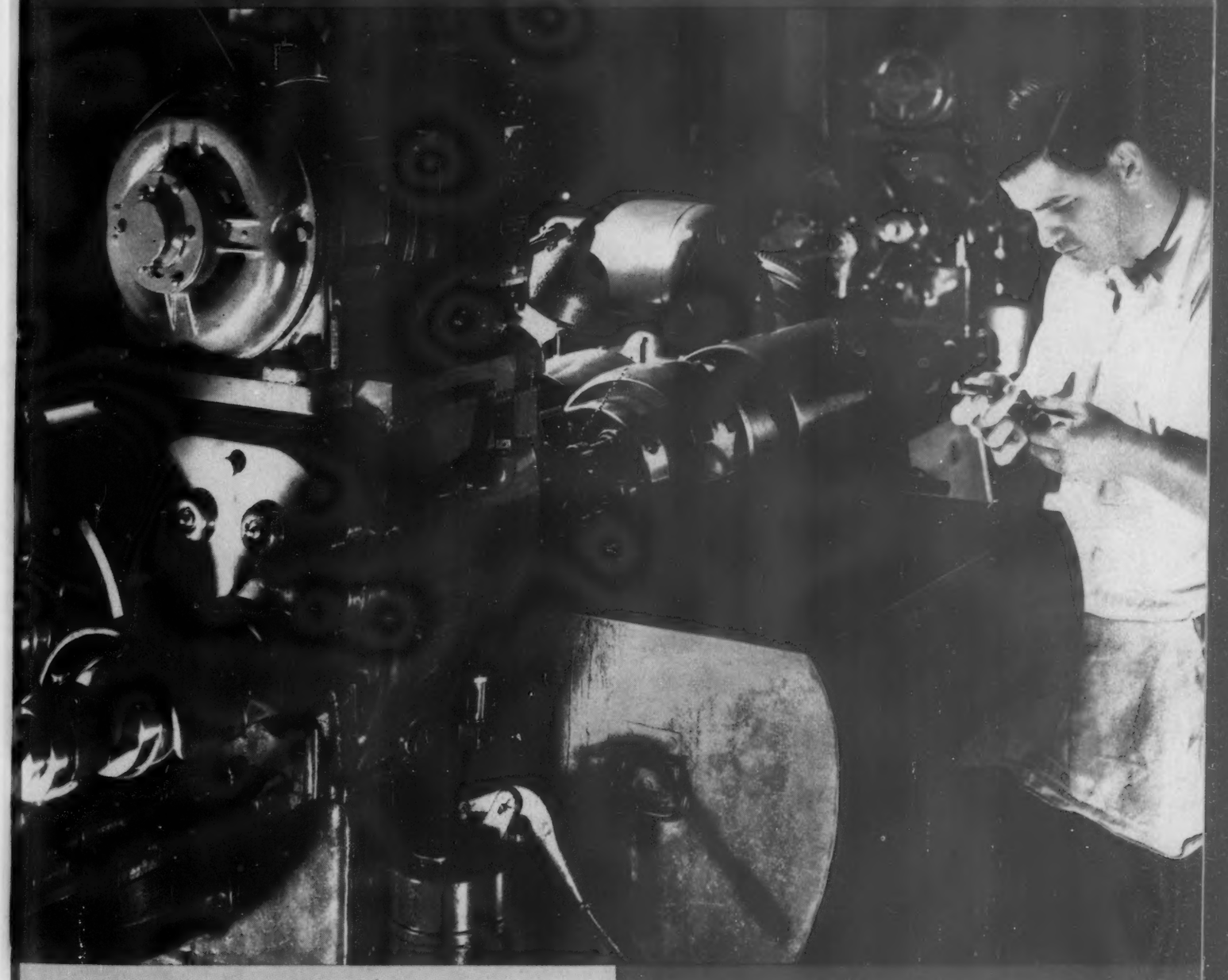

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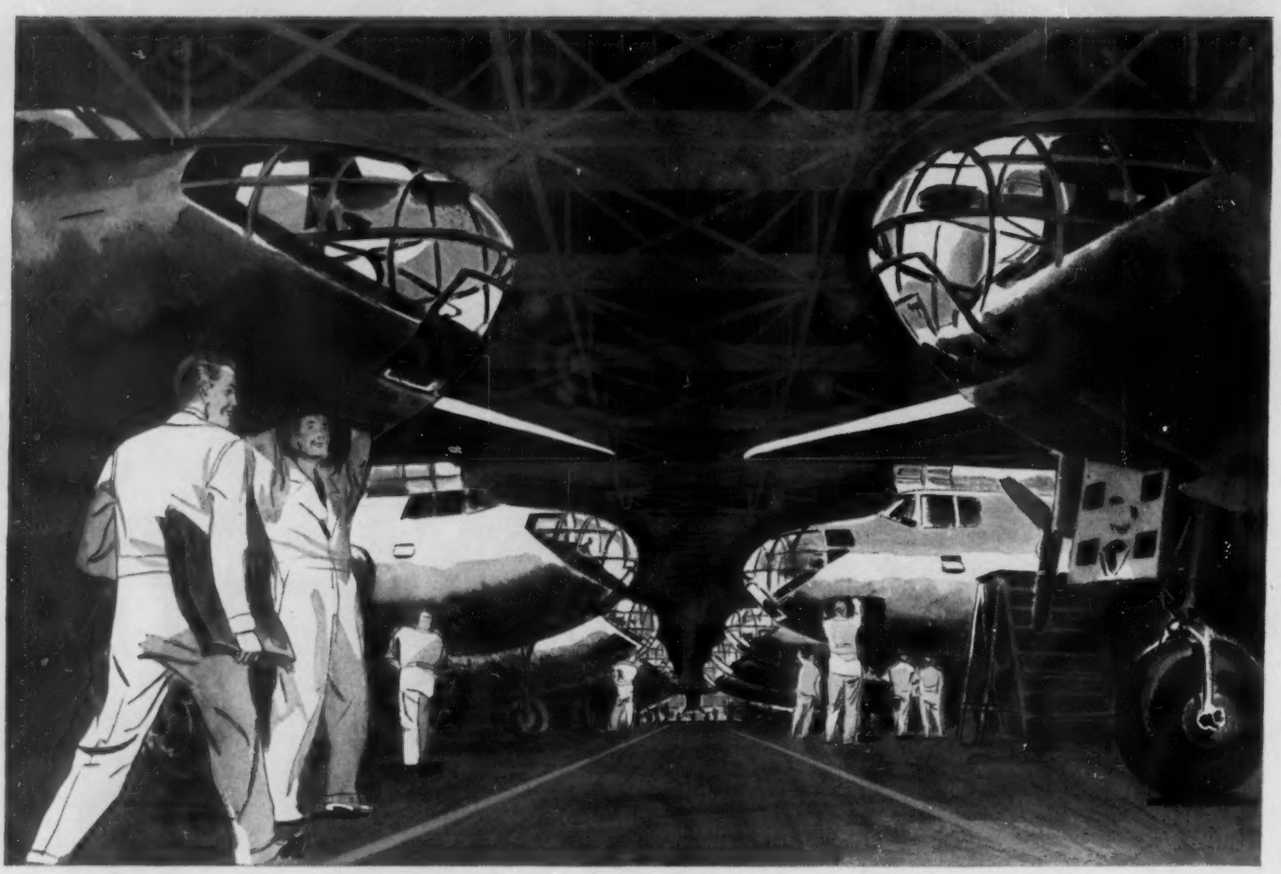

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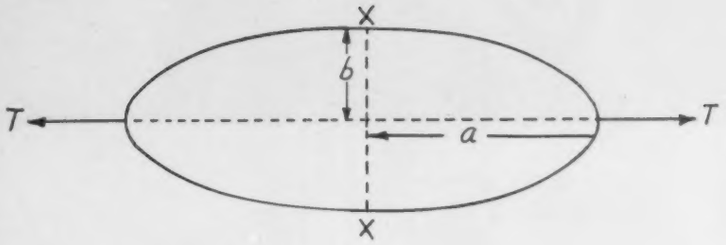

Fig. 6—Left, arrangement of forces about an inclusion when metal around particle is stressed in a direction parallel to the length of the particle

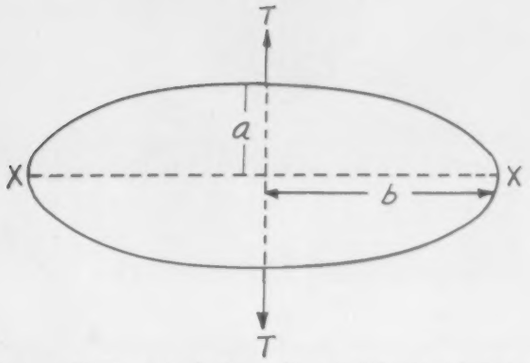

Fig. 7—Right, similar diagram for analysis of forces around an inclusion when metal is stressed in a transverse direction

AIRCRAFT DROP FORGINGS

INADVERTENTLY, two illustrations were omitted from the artice "Aircraft Drop Forgings", STEEL, *March* 16, 1942, *p.* 68 *and* 69. *Those two diagrams appear at the top of this page. To be sure that all references to them are clear, that portion of the article in which reference is made to these drawings is reprinted below.*

The heading of Table I which appeared was also incorrect so that table is repeated here with its correct title. The illustration labeled Fig. 6 *in the March* 16 *issue should have been labeled Fig.* 8 *and the reference to it in column one, p.* 68, *that issue, changed to Fig.* 8.

Effects of Excessive Reduction: This matter of excessive reduction and its detrimental effects on the properties in a transverse direction can be explained further by a consideration of the effect of nonmetallic inclusions. There is no doubt that the effect of forging on nonmetallic inclusions does result in a difference in toughness and ductility in the two directions. That the effect of inclusions on the directional properties is worthy of consideration is shown in Fig. 6.

Referring to Fig. 6 if a stress T is applied in the direction shown, the concentration of stress P along the line XX is given by the following formula:

$$P = T\left(1 + \frac{2b}{a}\right)$$

If a = 20 b, then:

$$P = T\left(1 + \frac{2b}{20b}\right)$$

$$P = 1.1\,T$$

This represents the state of affairs around an inclusion when a *longitudinal* stress is applied and it is seen that the concentration of stress is negligible so far as the factor of safety is concerned. But consider the state of affairs when a *transverse* test is applied, refer Fig. 7:

Again, $P = T\left(1 + \frac{2b}{a}\right)$

If $a = \frac{b}{20}$, then:

$$P = T\left(1 + \frac{40a}{a}\right)$$

$$P = 41\,T$$

Within the elastic limit, this is the situation around an inclusion when a transverse stress is applied. In this case the concentration of stress is considerable. Actually the ductility present in steel results in a reduction of this concentration of stress since the inclusion will tend to elongate in the direction of the pull, but it is not until the conditions approach these present when a longitudinal stress is applied that this becomes negligible.

It can be seen therefore that inclusions which have been elongated by forging are, to all intents and purposes, the equivalent of holes when their effect on the transverse properties is considered. The greater the reduction, the greater the extension of the inclusions in the direction of flow and the greater the effect on the transverse properties.

It is because of this difference in the directional properties that such pains are taken to produce correct grain flow in aircraft forgings. During rolling and forging, the original dendritic structure formed on casting is distorted in the direction of work. Since diffusion does not go on to completion, the segregates present take up a position which is dependent on the direction of plastic flow. The actual grain structure can be controlled by subsequent heat treatment, but the segregates remain drawn out in the direction of flow and so affect the directional properties of the forging.

TABLE I—Variation in Physical Properties with Direction of Testing

Direction	Yield Point Tons/Sq. In.	Max. Stress Tons/Sq. In.	Elongation Per Cent	Reductions of Area, Per Cent	Impact Ft. Lbs.
Longitudinal	43.0	51.0	23.5	61.0	64
20 degrees	43.0	51.0	23.1	59.0	64
40 degrees	43.0	51.0	23.5	58.0	45
60 degrees	43.0	51.0	16.5	28.0	27
80 degrees	43.0	51.0	15.0	26.0	18
Transverse	43.0	51.0	15.0	25.0	18

Charts Various Steps in Steelmaking Processes

Sequential steps in the manufacture of ferrous castings, open hearth, electric and bessemer steel and puddle iron are incorporated in a chart of blueprint form entitled "Outline of Metallurgy of Iron and Steel" recently prepared by F. E. Sanborn, 90 East Fourteenth street, Columbus, O.

The chart, which may be obtained for 50 cents, tabulates the representative analyses of various pig irons, and also each phase in the conversion of iron ore to such finished products as pipe, tubing, wire, tin, plate, sheets etc.

Modern Hearth

REFRACTORY PRACTICE

Use of dead burned magnesium oxide clinker for basic open-hearth and electric furnace bottoms minimizes repair and rebuild time. Material also employed to extend the hearth to new dimensions. Installation of ramming mixture is facilitated by a recently developed set of wooden forms

By H. N. BARRETT JR.
Basic Refractories Inc.
Cleveland

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Two refractories, Ramix and Ramix 82, are being extensively

Fig. 1—Brickwork in completed state ready to receive Ramix hearth

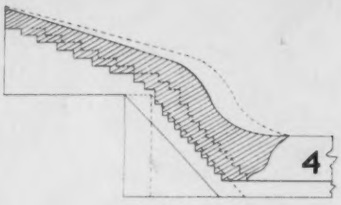
Fig. 2—Full rammed hearth partially finished. Refractory has been carried to the skewback along the backwall

Fig. 3—Completed working hearth. No magnesite or dolomite is "burned-in" over the Ramix

Fig. 4. Cross-hatching indicates Ramix on a furnace lengthening job. Chill box has been moved back and refractory tamped between new brickwork and old hearth. Dotted line defines original location of furnace parts

Fig. 5—Cross hatching shows application of Ramix to furnace which has been widened by moving frontwall buckstays. Dotted line defines original position of furnace components

Paper presented at the Ohio Section Meeting, Open-Hearth Committee, American Institute of Mining and Metallurgical Engineers, Columbus, O., Oct. 17-18.



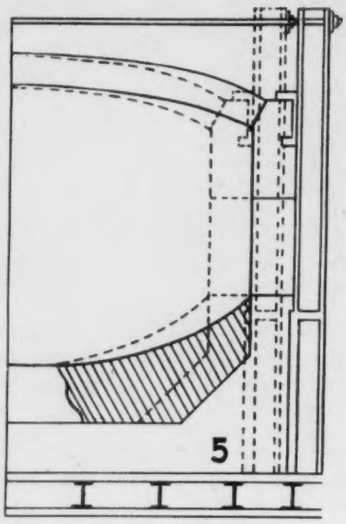
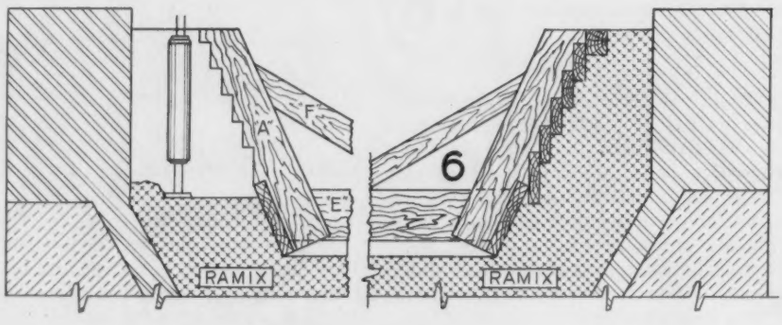
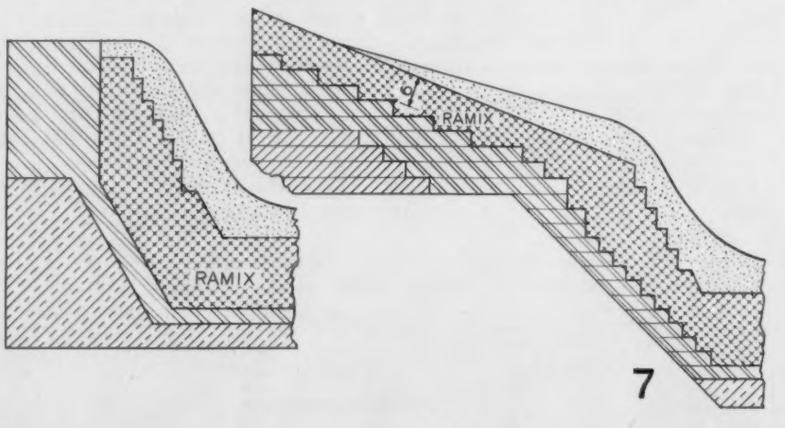


Fig. 6—Cross section of endwall (left) and of sidewall (right) showing forms used in ramming refractory in place

Fig. 7—Section of open-hearth bank (left) after application of fused material showing profile of Ramix construction. Longitudinal section (right) through endwall





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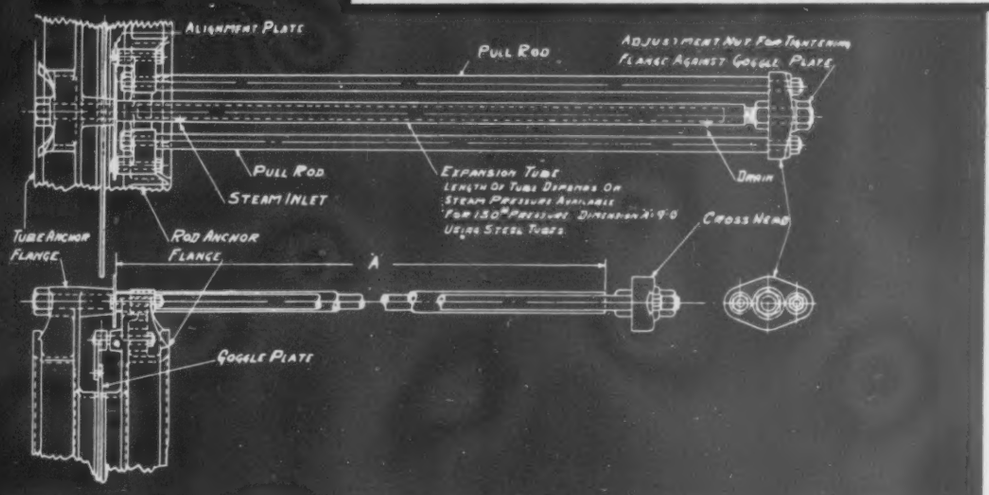
ALIGNMENT PLATE
PULL ROD
ADJUSTMENT NUT FOR TIGHTENING FLANGE AGAINST GOGGLE PLATE
PULL ROD STEAM INLET
EXPANSION TUBE
LENGTH OF TUBE DEPENDS ON STEAM PRESSURE AVAILABLE FOR 150# PRESSURE DIMENSION A IS 9'0 USING STEEL TUBES
DRAIN
CROSS HEAD
TUBE ANCHOR FLANGE
ROD ANCHOR FLANGE
A
GOGGLE PLATE

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MAKES THE GAS-TIGHT SEAL
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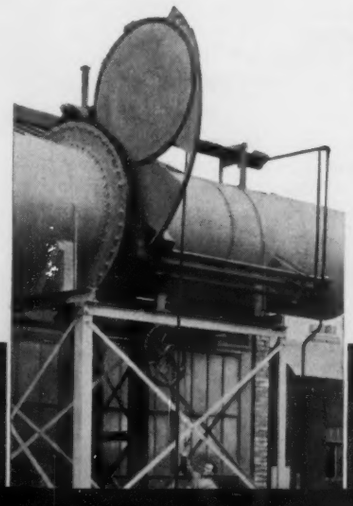

Operating a 120" Bailey Thermal Expansion Goggle Valve manually.

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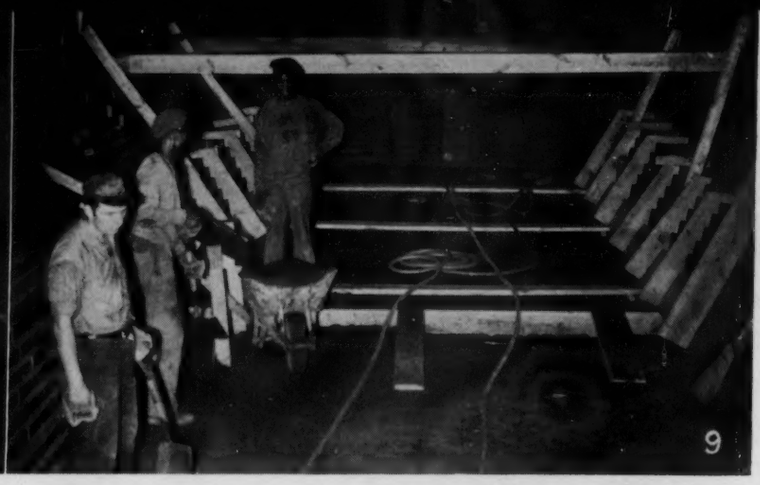

Fig. 8—Start of installation showing form in place for first section of flat. Hearth lining refractory is introduced through opening left in backwall. This eliminates delay in feeding it to furnace which occurs when using doors and charging buggies, etc.

Fig. 9—About half of flat has been rammed and forms for banks have been placed. A more efficient method is to ram entire flat and then to erect bank forms the full length of furnace

used to save time on furnace repairs and rebuilds without sacrificing in any manner the quality of the job.

Ramix is composed of a dead-burned clinker containing approximately 65 per cent of MgO (magnesium oxide) which has been carefully sized and bonded to yield on ramming a dense, strong structure. Ramix 82, as the name implies, is made from a clinker containing approximately 82 per cent MgO. The same care in sizing and selection of bonds is exercised in making this grade as in producing the regular grade. Ramix 82 was developed to meet the needs of electric furnace operators producing high-speed tool steel, but has since been used by electric furnace and open-hearth shops making steels other than those of a tool steel grade.

Technical considerations indicate that for some services Ramix 82 may be superior to regular Ramix but generally it should be left to the operator to decide whether performance will justify the increased cost of Ramix 82.

Some of the repair applications of Ramix are illustrated in sketches 4 and 5.

Portions of banks or of bottoms which have been removed to eliminate hearth sections containing metal and/or slag are easily and quickly replaced by tamping Ramix in the cavity. Many shops have lengthened their furnaces by moving the chill boxes back (Fig. 4) or have widened furnaces by moving front or backwall buckstays (Fig. 5). In either case Ramix can be used to advantage to extend the hearth to the new dimensions. Still other operators who have had trouble with ports and burner floors due to heats lying high in the furnace and/or to foamy slags have reported that a 4 to 6-inch surfacing of Ramix eliminates this refractory problem.

Repair jobs of this type have the following advantages:

1. Speed:
   a) By proper scheduling, brickwork can proceed concurrently with the Ramix job and brick masons, freed from the time consuming job of fitting brick into irregular cavities, can be used to expedite the necessary rebricking.
   b) As soon as the Ramix has been tamped in place the furnace can be brought to temperature, the hearth "dressed" and a heat charged.
2. Economy:
   a) Ramix costs less per volume than basic brick and is installed by ordinary labor.
3. Safety:
   a) A Ramix repair has as high a magnesia content as have most magnesite and slag hearths, is more uniform in composition, is dense, highly resistant to slaking and is installed without slag or mill scale additions. Residual MgO in a Ramix 82 hearth is considerably higher than in a fused magnesite and slag hearth.

The use of Ramix subhearths has become fairly common practice in the last two years, and the development has reached a logical conclusion in the full Ramix hearths which are now in service in a large open-hearth shop. Figs. 1, 2 and 3 illustrate the technique employed in the installation. A

Fig. 10—Flat with exception of tap hole section has been rammed. Front and back banks are rammed at same time. Man in foreground is following hammer operator and shoveling loose Ramix behind form. When material has been tamped to within 1½ inches of top board, another plank is fastened to forms and procedure repeated

Fig. 11—Entire flat has been rammed, banks in half the furnace not shown are completed, and remainder of banks are well on way to completion. Furnace ends can be rammed using forms, but in this furnace construction of brickwork did not make use of forms practicable

NO, we didn't shoot it down—but in the long chain of defense production McKee has been an important link in providing facilities for the production of America's two most vital wartime needs—steel and oil.

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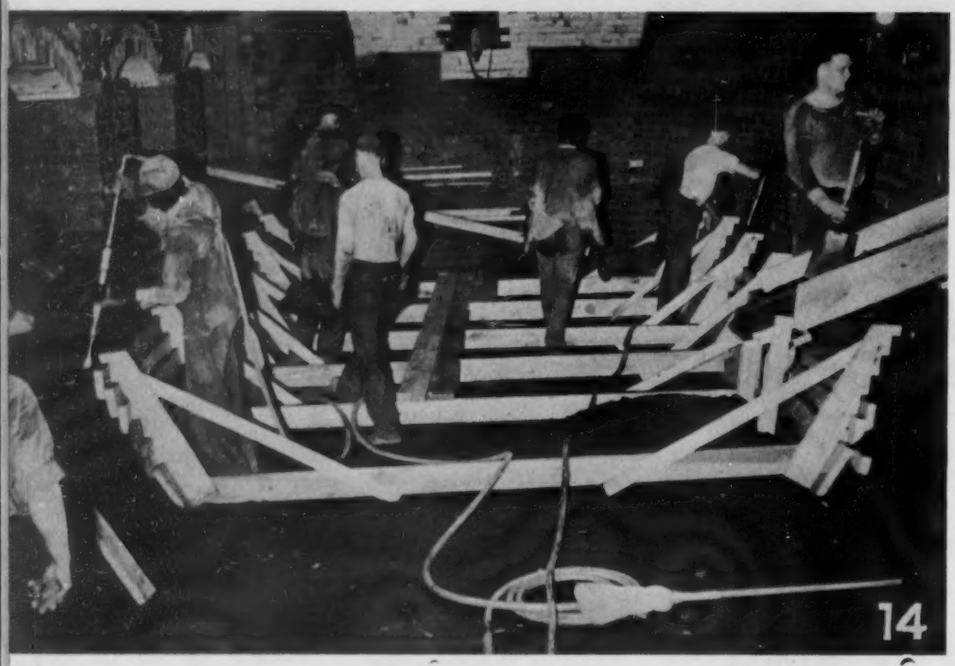

Fig. 12—Looking toward front of furnace showing completed Ramix subhearth. After forms are removed the junction of banks and flat is carefully rammed to insure good seal

Fig. 13—Finished hearth looking toward backwall. Taphole is seen in foreground

Fig. 14—Entire flat has been rammed, banks of other half of furnace are completed and front bank of other half nearly finished. Boards have been added to the form as height of bank increases

total of 79¾ tons of Ramix was used to give a 15-inch hearth in this 150-ton furnace. The job was completed in 30 hours using two and three hammers. The furnace was dried with gas and wood fires. Oil then was used to raise the temperature to 2900 degrees Fahr. This temperature was held until the moisture stopped seeping through the pan. The hearth then was slagged, the slag tapped, the oil taken off and the bottom cooled to 2000 degrees Fahr. The doors were raised and the temperature dropped to 1400 degrees Fahr. The furnace was brought back to temperature, the cracks sealed with screened magnesite (fine Ramix would probably have been better) and the bottom covered with raw dolomite. The yield on the first heat was 91.2 per cent. Since the time from the start of the installation until the first heat was charged was 196 hours (which includes 30 hours for ramming the bottom, 50 hours drying out green brickwork and 12 hours for slagging and chilling the hearth) it is apparent that this type of hearth approaches the ultimate in speed of installation. Full rammed hearths should be of particular interest to operators of new shops, to shops which have, in the recent past, jumped from 40 to 50 per cent furnace operation to 100 per cent operation, and to shops constructing new furnaces. In each of these instances there is likely to be a shortage of skilled, experienced furnacemen to burn in a bottom. The installation of a full Ramix hearth requires a minimum of skilled furnace help.

A set of forms has recently been developed to facilitate the installation of Ramix hearths of subhearths. The forms are shown in Figs. 6 and 7. This method of installing banks has many advantages over the original method:

1. Speed. The dead burned clinker is confined and can be rammed as fast as it is fed to the form.

2. Ease. It is obviously much easier for the men to operate the hammers in a vertical rather than horizontal position.

3. Sounder, denser structure. The contour of the banks is predetermined by the shape of the forms and not subject to any hit-or-miss installation of the material. Since the ramming is done in a confined area the ultimate in density and strength is achieved. The terraced structure of the finished Ramix banks simplifies fusing grain magnesite in place as the magnesite adheres to the ledges rather than building up at the base of the bank.

Figs. 8 to 14 show the various steps in the installation of a Ramix hearth using the forms previously mentioned.

Operators, for many years, have made basic ramming and casting mixes in their own shops, hence no claim for originating this branch of the refractory art is made. However, it is believed that a contribution to basic refractory progress has been made by providing in Ramix and Ramix 82 scientifically designed and controlled magnesite ramming mixtures for the many applications which exist for products of this type in basic open-hearth and electric furnace shops.

Chart Answers Over 400 Joining Questions

Over 400 fluxing questions dealing with welding, brazing or soldering are answered in a new chart prepared recently by Krembs & Co., 669 West Ohio street, Chicago.

Metal working concerns interested in learning quickly what fluxes are suited to a given application may obtain complimentary copies by requesting the chart on their letterheads.

Racks of finished steel tubes are tiered four-high by a "Clark" Fork Truck for Pittsburgh Tube Co., Monaca, Pa., conserving floor space and resulting in the advantages quoted at the right.

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New, illustrated, 32-page booklet showing how to cut handling costs by using properly designed packages for interplant shipment of materials and parts. A copy will be sent free on request.

Inspection efficiency up 10%

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They operate 24 hrs. a day — seven days a week!

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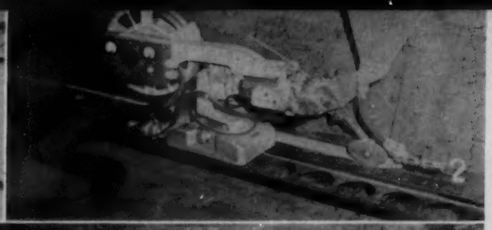
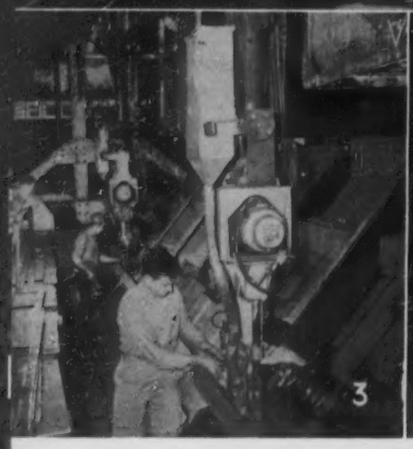




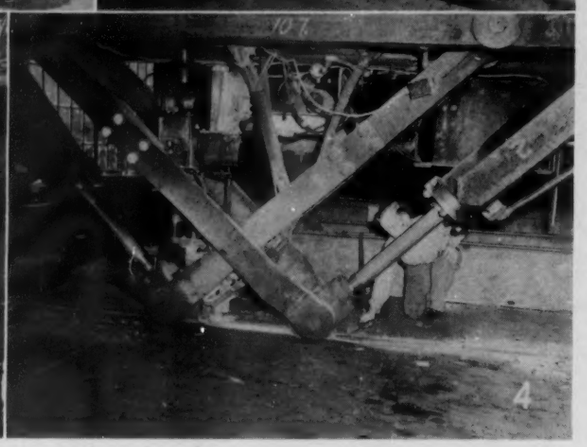


Fig. 1—Unionmelt welding process joining 1¼-inch plate in just one pass using approximately 2000 amperes

Fig. 2—Machine especially designed for fillet welding, using 2000 amperes

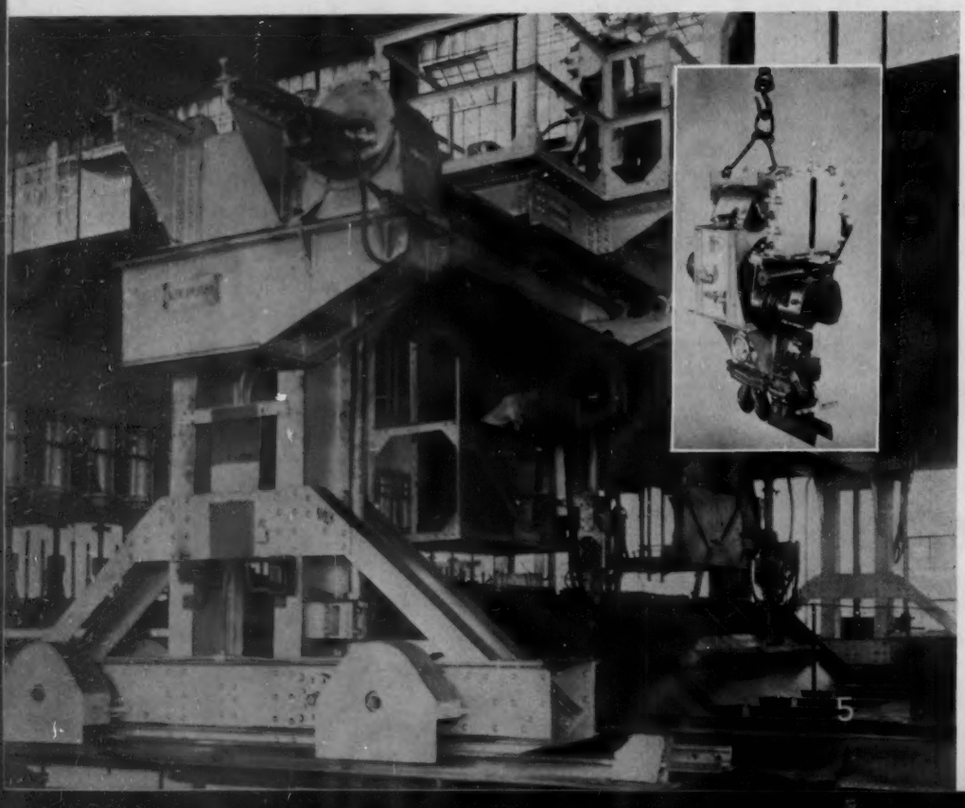
Fig. 3—Another view of the huge automatic welder that employs the two 4000-ampere heads shown here

Fig. 4—Note heavy hinged members and hydraulic pistons used to clamp work in setup shown in Fig. 5

AUTOMATIC WELDING

In Ship Construction

. . . . includes much plate work joined by the Unionmelt process



OF THE ESTIMATED 24,000 welding operators employed by the 50 or so Navy and private yards on the coasts and Great Lakes, about 1000 to 1500 are using oxyacetylene equipment for welding brass, copper, aluminum and other special materials. Much service piping is also oxyacetylene welded. Oxyacetylene heating is used for pipe bending and for straightening and correcting buckling which sometimes results from the welding of ship hulls, decks and superstructures. By far the greater number of all welding operators, however, are engaged in manual arc welding.

An estimated 800 men, however, are operating automatic electric welding equipment with which they can deposit metal at a much higher rate of speed. An operator and a helper to each Unionmelt machine can weld at current densities from 14,000 to 30,000 amperes per square inch in the rod using weld rod from 1/3 to about 1 pound per minute.

Because of the high current density and the high rate of heat input into the weld, preparation for welding and the Unionmelt welding procedure are unusual in several respects.

Make Butt Welds in One Pass

In some yards, butt welds ⅜-inch deep are being made in one pass in plate that is square-butted tightly together without any beveled preparation. When beveling is used, the Vs are smaller and the amount of metal required to complete the joint is much less than that required for the other welding methods commonly used by shipbuilders. Therefore, the 1/3 to 1 pound of rod melted per minute generally produces two to three times as much length of welded seam as would be produced with an equal weight of electrode used in conventional welding processes.

No excess heat is introduced into the joint because of the high speeds. Furthermore, the deep penetration of a single pass gives more uniform heating of the entire thickness of the joint and reduces the tendency for the welded pieces to bow. Obviously, the fewer the number of passes, the less the cumulative shrinkage effect. Most types of joints are assembled for this welding by simply butting them tightly together. All of these factors combine to eliminate the need for ap-

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From a paper presented by F. G. Outcalt and J. M. Keir, engineers, The Linde Air Products Co., New York, at the annual meeting of the American Welding Society, Philadelphia, October, 1941.

Fig. 5—Large automatic welding equipment uses head shown in inset, welds at currents up to 4000 amperes

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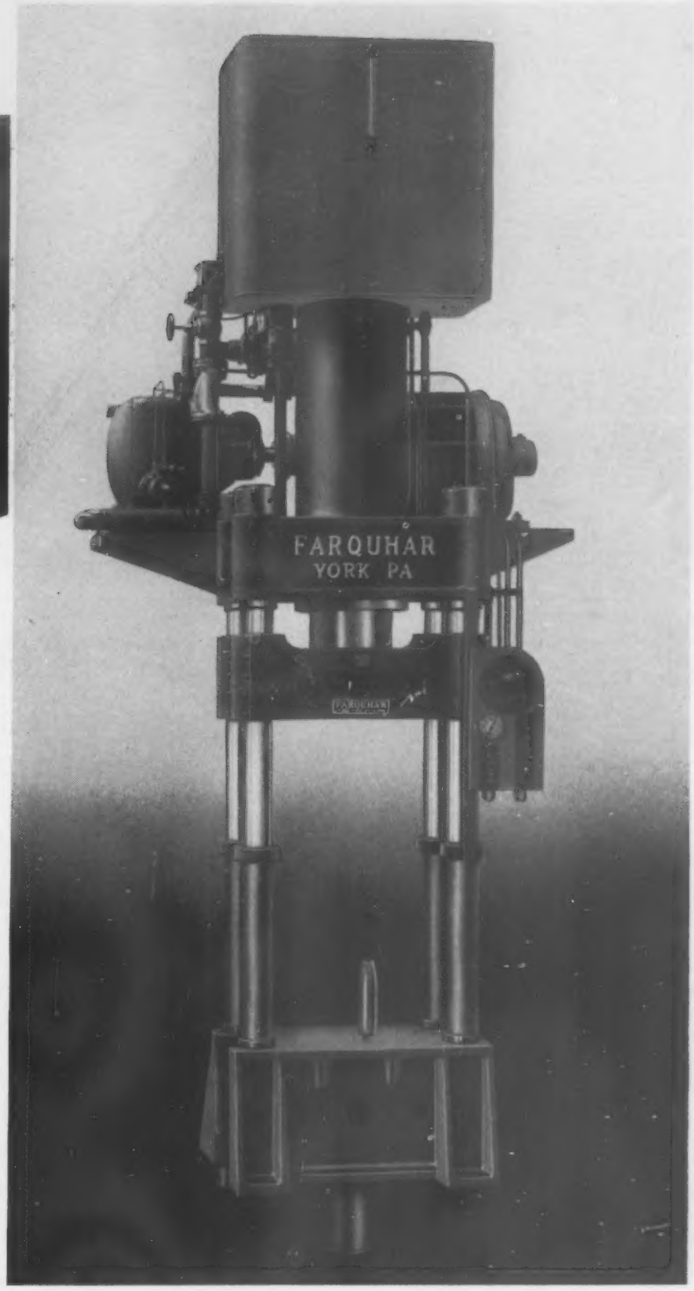

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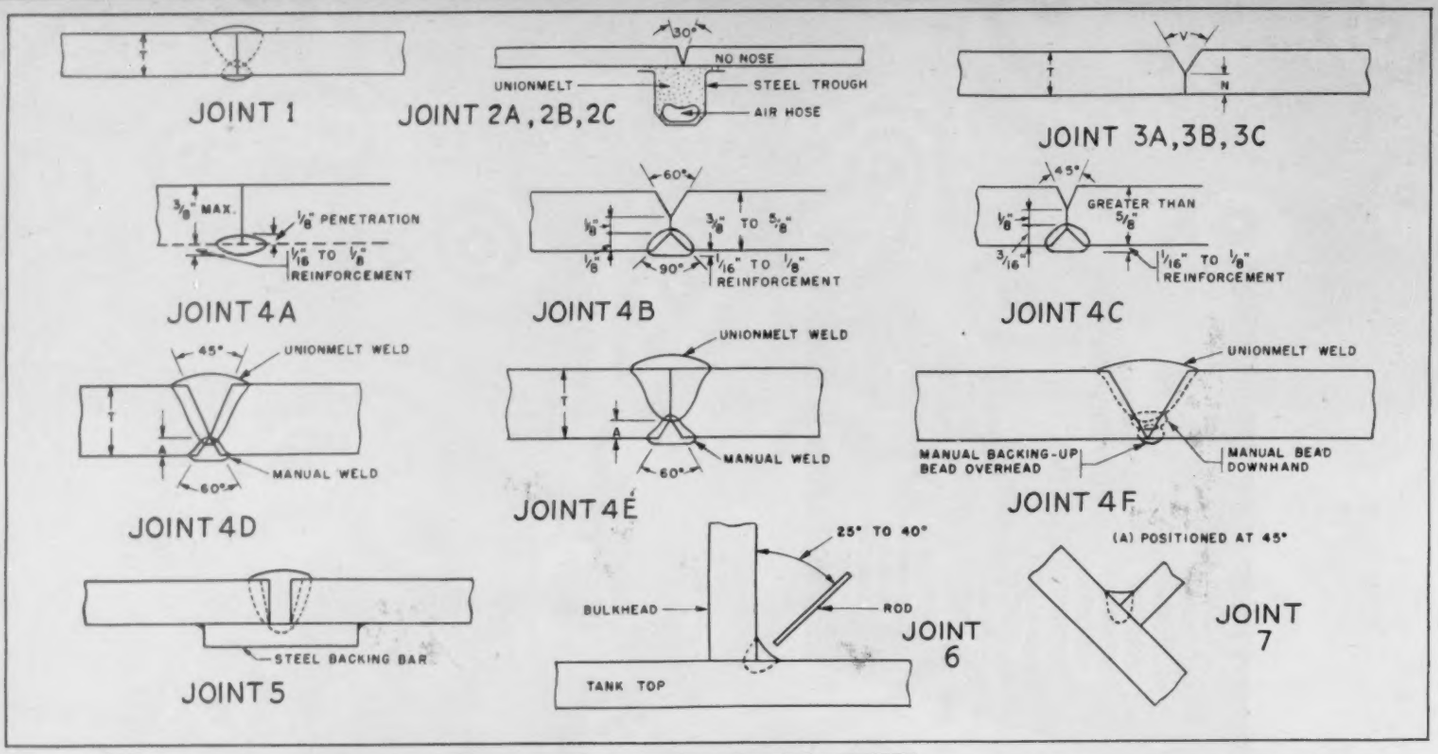

These are the various joints on which data is given in the table

TABLE I—Data on Welding of Plates by Unionmelt Process in Ship Construction

Thickness, Inches	Joint No.	Amps.	Volts	Speed In./Min.	Welding Rod Dia., In.	Lb./Ft.	Air Pressure Lb./Sq. Inch
Joint: Two-pass Unionmelt butt welds backed with platen or heavy structural shape. (Used for keel plating seams, tank tops, tweendecks, bulkheads, etc.)							
			Backing Pass				
¼	1	400	32	28	5/32	0.10	
½	1	700	33	22	7/32	0.23	
			Finishing Pass				
¼	1	500	30	27	5/32	0.12	
½	1	750	35	20	7/32	0.27	
Joint: Melt-backed Unionmelt butt welds. (Tabulated conditions provide reinforcement or flat bead on backs of welds. Backing melt is 3½ inches deep above a 3½-inch diameter fire hose.)							
¼	2A*	960	42	38	¼	0.15	70
½	2B*	960	37	22	¼	0.33	60
¾	2C*	1080	35	15	7/32	0.53	45
Joint: Copper-backed Unionmelt butt welds.							
¼	3A†	725-825	29-32	28-31	5/32	0.14-0.23	
½	3B†	1075-1175	34-37	20-23	¼	0.38-0.45	
¾	3C†	1200-1300	36-39	13-14	¼	0.60-0.75	
Joint: Manual weld-backed Unionmelt butt welds.							
Manual Weld Deposited in Downhand Position (Plates Turned Over for Unionmelt Welding)							
¼	4A	550	28	27	5/32	0.13	
½	4B	850	33	22	¼	0.30	
¾	4C	1050	35	16	¼	0.50	
		Manual Weld Deposited Overhead					
¼	4E§	550	28	27	5/32	0.13	
½	4D§	850	33	22	¼	0.30	
¾	4D§	1050	33	14-16	¼	0.50-0.57	
Combination Overhead and Downhand Manual Weld Backing (Used as shown for flat keel, bottom shell, deck, bulkhead and tank top joints. All 30-degree vees.)							
½	4F	700	35	13	¼	0.40	
¾	4F	750	35	8.5	¼	0.60	
Joint: Integral steel-backed Unionmelt butt welds. (Minimum spacing, 5/16-inch.)							Minimum Thickness Backing Bar, Inch
¼	5‡	950	27	34	¼	0.17	¼
½	5‡	1200	27	16	¼	0.54	⅜
¾	5‡	1200	28	9	¼	1.10	½
Joint: Non-positioned Unionmelt fillet welds. (Used for joining bulkheads to tank tops, etc.)							
¼	6	450	28	25	⅛-5/32	0.14	
½	6	750	33	12	5/16	0.53	
Joint: Positioned Unionmelt fillet welds. (These conditions if used in applying a fillet to each side of the web plate will yield 100-per cent penetrated tee joints with the work positioned at 45 degrees where the thickness of the web plate is equal to or less than the size of the fillet leg.)							
¼	7	650	27	28	5/16	0.11	
½	7	850	31	16	¼	0.43	
¾	7	1080	31	11	¼	0.95	

*Edge preparation: 2A—square; 2B and 2C—no nose.
†Joints: 3A is 60-degree vee, ⅛-inch nose; 3B is 60-degree vee, 5/16-inch nose; 3C is 45-degree vee, 5/16-inch nose.
§Dimension A is ⅛-inch for 4E, ¼-inch for 4D.
‡Edge preparation: Square for ¼-inch thickness and 30-degree vee for ½ and ¾-inch thickness.

preciable overall allowances for shrinkage.

With this process there is nothing to indicate even at close view that perhaps 30 to 90 kilowatts of electrical energy is being transformed to heat, that welding rod is being melted at high rates, and that almost twice as much base metal as added rod metal is being fused because the arc is hidden under a granulated flux material fed by gravity through the welding head and laid along the seam to sufficient depth to cover completely the welding zone and the end of the bare steel welding rod. Excess flux is picked up from the completed mold by a vacuum collector on many of these machines.

Welding units of the type shown in Fig. 1 feed rod from coils of approximately 25 pounds weight and are used for making welds requiring up to about 2000 amperes. Welds of about 1¼-inch thickness can be made in one pass with this machine. The equipment can be readily moved about on flat surfaces but must usually be handled by crane for longer moves.

Arrangement of this machine shown in Fig. 2 was especially designed for fillet welding where guiding must be accurate with provision for following any waviness in the plate. The same type unit is shown in Fig. 6 making the corner butt joint between the spar deck and shear strake of a Great Lakes ore freighter. Four 500-ampere welding transformers are connected in parallel to supply the welding current to this automatic welding machine. Most yards use 1000-ampere

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In warehouse, Baker Truck saves floor space by tiering pallet-loads two-high.

BAKER TRUCK cuts time 50%

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PEQUANOC RUBBER CO. also conserves man power

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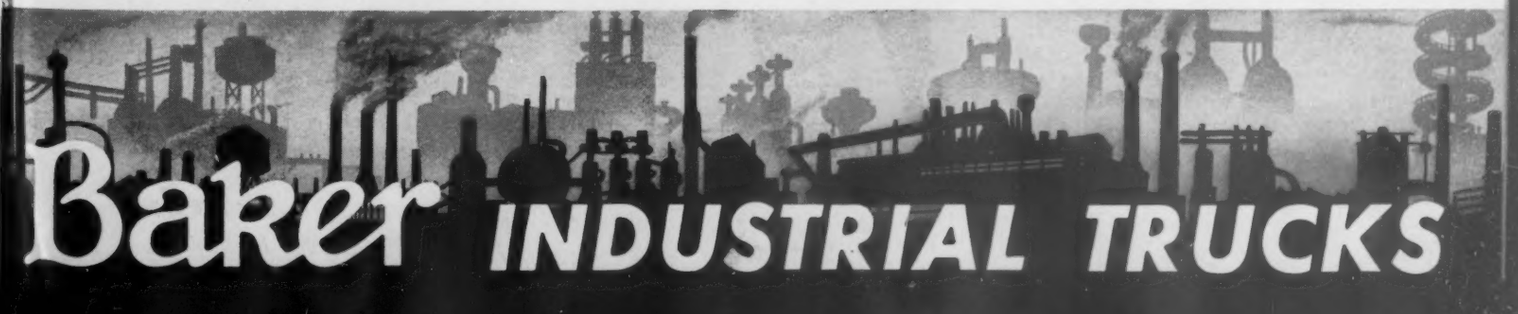
Loading onto truck is made easier by use of wheel pallets, which can be pushed into position.

One man with Baker Truck loads box-car in less than half the time formerly required by six men.



transformers either singly or connected in parallel.

A few welding heads are supplied with direct current from standard welding generators. Regardless of the source of current, provision is made to make and break the supply current instantaneously at full load for starting and stopping a weld. A contactor operated from a small switch on the welding head may be connected in the primary supply lines to the welding transformers, in the output circuit of direct-current generators or in the field circuit if the generator field circuits can be isolated.

The head, shown in the inset in Fig. 5, must be mounted on a substantial supporting structure. It is capable of feeding as much as 4000 amperes of welding current to welding rod as large as ½-inch in diameter. Two of these large heads were installed in a shipyard in 1936. Since that time, many of the smaller units and additional large heads have been put in service in that yard. The highly developed methods of construction there and the use of large auxiliary mechanical equipment specially designed for mass production of tankers have led to a greater use of automatic welding than is found in any other shipyard. Figs. 5, 4 and 3 show a part of the installation of the large automatic welding equipment with closeup views of welding with the large heads.

The use of this process in shipbuilding will be even a more important factor in the immediate future in speeding welded construction. An operator and a helper can produce from 200 to 400 feet per 8-hour day of finished seam in steel of average ship-plate thickness. Hence the use of this process releases many an arc-welding operator for the greater amount of welding which on any ship is not adaptable to automatic machine methods.

Prefabrication is the principal field of application of the Unionmelt welding process, although in many yards the machines are taken upon the ways for the welding of shell bottom plating, tank tops and decks. Prefabrication is applied to sections of tank tops, shell plating, bulkheads, shaft alleys and decks as well as sections of superstructure, king posts and booms of cargo-handling equipment.

Butt welds and fillet welds are the types principally made. Smaller fillets of less than about ¾-inch leg dimension are frequently made without positioning the pieces, but the large fillets tend to sag, and the pieces must be tilted so that the diagonal surface of the weld will be approximately horizontal.

In making butt welds, full advantage of the deep penetration of

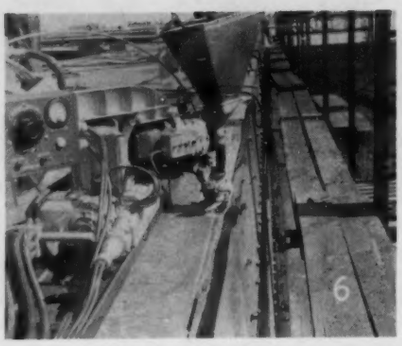


Fig. 6—Making corner butt joint between spar deck and shear strake of an ore freighter

Unionmelt welding and its consequent capacity to weld considerable thicknesses in one pass cannot be taken unless some means is provided for supporting the molten metal from the under side. Several methods of backing welds and of combining manual arc welding and automatic Union melt welding are indicated in the tables of data for various types of joints used in shipbuilding.

Joint 1 requires tightly fitted edges to prevent the weld metal from flowing through. But for plate thicknesses less than ½-inch, contact with a platen or structural members on which the subassembly is laid is usually needed for additional chill to control the fluid metal. The edges must be straight and fitted tightly enough to exclude a shipfitter's feeler. If mill-sheared edges are used, it may be necessary to grind or otherwise condition the edges to obtain this result.

The weight of the plates assembled on a platen is usually sufficient to maintain satisfactory contact, but it may be necessary to hold them down by weights, roller or structural means. Note piston-actuated arms holding down work in Fig. 5.

Joint 3A requires uniformly close

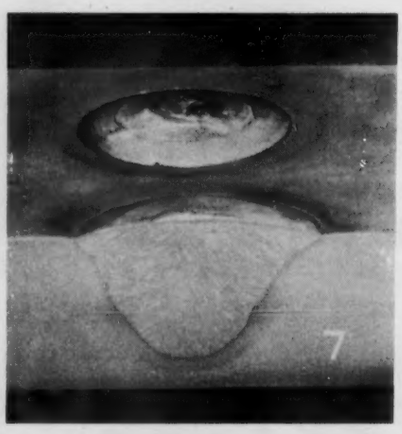


Fig. 7—Shown above is a typical section through plug weld

and tight contact between the underside of the seam and the copper-backing to prevent the weld from running out. Uniformly sound welds require removal of all surface scale, rust and other material so that clean metal is exposed on the surfaces in contact with the copper-backing-up means.

In joint 4 series, the manual welds replace the initial Unionmelt weld of Joint 1. The manual weld must be sound, uniformly reinforced, and of a depth (measured by penetration plus reinforcement) at least one-half the plate thickness for plates up to ½-inch thick in order adequately to back the finishing Unionmelt weld and assure complete overlapping.

The top manual pass in joint 4-C should be thoroughly cleaned of slag before Unionmelt welding.

With joint 5, the steel backing bar should bear uniformly on the underside of the seam in order to prevent fluid metal from running out. If considerable variation in edge-bevel and edge-distance is encountered, it should be compensated for by variation in welding speed to maintain desired reinforcing. The distances between the edges and the bevels tabulated are the minimum allowable.

If joints 6 and 7 are not fitted tightly, some method of damming the molten metal must be employed so as to prevent a runout. Cleaning by grinding or wire-brushing of the surfaces to be welded will permit the use of highest welding speeds and help to produce uniformly sound welds.

Procedures differ in detail in various shipyards, but generally the assembly of sections of hull, inner bottoms, bulkheads, and deck starts with the laying of the prepared plates on a large platen or on a skeleton table made of T-bars, I-beams, or other structural steel shapes. Partly penetrated automatic welds are then made and the stiffeners are fillet welded to the plate, which is then turned over and automatically welded from the other side, with ample penetration into the weld previously made from the first side.

Frequently, the hull bottom plates are laid individually on the ways, an overhead weld is made on the underside of the plate by manual arc welding and, with this as backing, a Unionmelt automatic weld is made from above. Similar procedure is often used in applying deck or tank top plating, although sometimes the plate joints land on a flanged structural member or are fitted with a steel backing strip.

Plug welding is an operation of ship construction for which the Unionmelt process is well suited.

(*Please turn to Page* 107)

How a leading tool manufacturer reduced material costs, time and labor with PENNSALT CLEANER

A variety of steel and iron tool parts are cleaned in a solution of Pennsalt Cleaner in this still tank prior to Parkerizing . . . with important savings in cleaning time and labor.

Ingersoll-Rand Company, famous manufacturer of pneumatic tools, compressors and other equipment, has achieved important savings in three cleaning operations by using two Pennsalt Cleaners.

1. For still tank cleaning of many metal parts prior to Parkerizing, Ingersoll-Rand uses a Pennsalt Cleaner saving time and labor.

2. Similar savings have resulted from Ingersoll-Rand's use of the same Pennsalt Cleaner for still tank cleaning of metal parts after hardening.

3. In spray washers which clean iron and steel castings, forgings and bars, bronze, brass, zinc and aluminum parts . . . about 10,000 different metal parts . . . Ingersoll-Rand uses another Pennsalt Cleaner with great success. This cleaner efficiently removes machine oil and polishing compounds from the metal parts, and also provides rust protection between processing steps. By changing to Pennsalt Cleaner Ingersoll-Rand saves an estimated 37% in the cost of cleaning materials . . . *and* gets better results!

If you have a metal cleaning problem, there is a Pennsalt Cleaner which will meet your specific needs . . . and probably save *you* valuable time, labor and cost. Write today to our Pennsalt Cleaner Division, Dept. S, for information.

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Fig. 1—Overhead model of cutter designed to be used with multiple rolls of flexible packing material

IMPROVED PACKING METHOD

By PAUL THOMPSON
Sherman Paper Products Corp.
Newton Upper Falls, Mass.

. . . . helps relieve container shortage in handling and shipping operations at same time effecting important savings in shipping weight and space

FACING A drastic shortage in shipping containers, many manufacturers are finding the solution to their packing problems in an unusual packing material—Corroflex. While not a container, this new type of packing material replaces many types of containers including cartons, boxes, crates and bags. It is a paradoxical material, too, in that although it is corrugated it folds like uncorrugated material.

This flexible packing material is used for inter-department and inter-mill shipments as well as for shipments to consumers, for large ungainly products and for the endless number of sizes and shapes that pass over shipping-room benches. Thus it has many important applications in materials handling work. And while many shippers have turned to flexible packing to relieve shortages in shipping containers, they have found unexpected savings in material cost, packing time, shipping weight and space—savings that have often been in excess of 50 per cent.

Physical Characteristics: This packing material has several unusual characteristics. Although it is a corrugated product, it is different in that both the backing sheet and the corrugating sheet are especially selected for flexibility as well as for cushioning properties and strength. The backing sheet, which becomes the outer wrap in use, is No. 1 water resistant kraft. The corrugated cushion is the so-called "B" flute with 20 per cent more weight-bearing corrugations than the "A" flute commonly used in cartons.

In the manufacturing process, the tops of corrugations are indented diagonally, so that the material can be folded almost as easily as wrapping paper. The indenting tends to give greater resiliency to the corrugations by providing air pockets or mounds to act as load bearers. This air mound characteristic is augmented when the material is used, inasmuch as folding tends to make compartments in the corrugations.

Methods of Use: Packing operations with this material substitute one or a limited number of sizes in place of a great range of container sizes. Cutters, used for dispensing the material in roll form, are designed for use on the bench, over the bench, and under the bench; for single rolls and multiple-roll units. Specially designed for this specific use, they allow the material to be cut as easily as wrapping paper is cut from a wrapping paper dispenser. The material is also available in sheets for large volume use in production packing. Fig. 1 shows a typical setup with a cutter mounted above the packing bench and handling two rolls of Corroflex.

While sealing tape is most frequently used in packing with this material, steel banding, twine and stitching are also widely used.

Shipments of Small Products: For the packing of the endless stream of sizes and shapes that pass over packing benches, certain basic packing methods have been developed to cover cubical, odd shaped, and cylindrical products. Fig. 2 reveals one of the basic packing methods used in making up small packages.

Shipment of Large Products: Suggestive of wide adaptability of this

Fig. 2. (Left, below)—One of the basic packing methods used on small packages

Fig. 3. (Right)—Cream separator parts and packaging methods

Scully Service

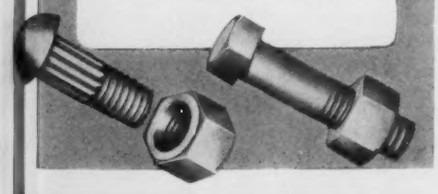
Structural material
Plates, various qualities
Floor Plates
Sheets: Hot Rolled, Cold Rolled, Galvanized, etc.
Bars (all shapes): Hot Rolled, Carbon and Alloy grades
Hot Rolled Strip Steel
Spring Steel · Tool Steel
Drill Rod
Cold Finished Bars, Carbon and Alloy grades
Wire
COR-TEN and MAN-TEN Shapes, Sheets and Plates
Abrasion-Resisting Sheets and Plates
Eaves Trough, Conductor Pipe
U·S·S Stainless Steel and Stainless products
Expanded Metal
Rails
Boiler Tubes
Rivets, Bolts, Nuts, Washers
Dardelet Rivet and Machine Bolts
Nails
Welders and Welding Accessories
Chain
Clamps
Flanges
Expanders, etc.
Hoists, Shears, Rolls, Punches, Cut-Off Machines, Saws, Nibblers, etc.

In Stock! Dardelet Bolts

We can offer immediate shipment of both Dardelet Rivet Bolts and Dardelet Machine Bolts. These bolts save valuable time and labor and assure permanently tight bolts.

The Dardelet Rivet Bolt is a ribbed bolt with Dardelet self-locking thread, and is widely used for field erection of structural steel. Has recessed nut. Bolt is driven in and nut is applied with wrench. Economical and strong.

The Machine Bolt with Dardelet self-locking thread is for general use where vibration is present.



Don't give up without calling Scully!

CHICAGO	**BRUnswick 2000**
Teletype CG. 605	
BALTIMORE	**GILmore 3100**
Teletype BA. 63	
BOSTON	**STAdium 9400**
CLEVELAND	**HEnderson 5750**
Teletype CV. 153	
PITTSBURGH	**CEdar 7780**
Teletype PG. 475	
ST. LOUIS	**MAin 5235**
MINNEAPOLIS - ST. PAUL	**NEstor 2821**
NEWARK, N. J.	**BIgelow 3-5920**
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STEELS THAT MEET THE CHALLENGE OF TODAY AND TOMORROW

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SCULLY STEEL PRODUCTS COMPANY

Distributors of Steel and Steel Products

UNITED STATES STEEL

FASTER PICKLING of Tin Plate aids canning of ARMY FOOD

In the pickling of tinplate in a well-known mill, all-welded Monel crates are speeding pickling and reducing costs, mechanical damage and maintenance.

FIRST THINGS FIRST

With the Nation at war, supplies of Monel, Nickel and Nickel Alloys are needed for our armed forces. All efforts must now be aimed toward victory. In the meantime The International Nickel Company will continue to issue information which it is believed will be of interest to metal users who are concerned with the war needs of today and the peace-time progress of the future.

Welded, streamlined Monel pickling crates help the program by handling larger pay loads in less time

Hundreds of tons of food for our armed forces now await canning and packing. In the last six months of 1941 the Army purchased 20,000,000 cans of tomatoes alone . . . not to mention corn, peas, peaches, pineapple and pears. The demand on tin plate mills is heavy...with *speed* the order of the day.

In this situation welded Monel pickling equipment is proving its worth. Strong, tough, light in weight, it is easily handled, carries larger loads through faster.

Tough, corrosion-resistant, long-lived Monel pickling equipment in all manner of plants is boosting production, eliminating bottlenecks . . . thereby contributing to our all-out effort for Victory.

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Sheet . . . Strip . . . Rod . . . Tubing . . . Wire . . . Castings

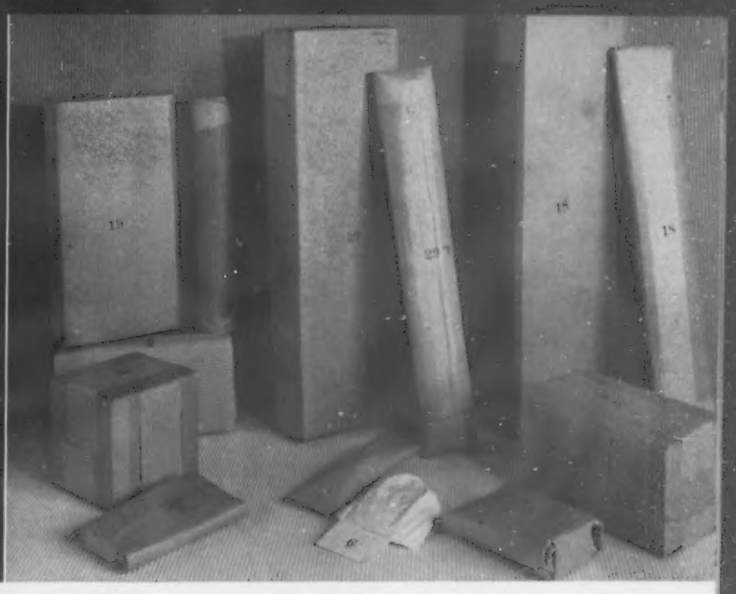


Fig. 4. (Left, above)—Material used to pack automobile fenders to protect the fine finish. The wrapping is applied while work is held in a special jig

Fig. 5. (Right)—Identical parts packed in ordinary cartons, with the flexible packing material to illustrate savings in space that it permits

material is Fig. 4 which shows its use in packing automobile fenders. This is a production operation using specially designed workholding jigs. This product is typical of many which are pre-packed before being placed in stock to save time and avoid damage in stocking. Previously packed in crates, the new method has saved large sums in packing materials, in time and in shipping cost. The savings in space are obvious since the method permits replacing a cubical crate with a package that can be nested for shipment.

Inter-Plant Shipments: The great increase in subcontracting has brought about problems in packing for shipment between fabricating plant and assembly plant. Many manufacturers have found that Corroflex can be used effectively as a speedy method of packing, yet it affords adequate protection to the shipments and saves time in unpacking for further production. Methods range from individual wrapping to multiple-wrapping, with material being used between and outside nested products. The multiple package is then tied with rope or steel bands. For inter-departmental shipments, too, the flexible corrugated material is often used as a quick interlining cushion when products are stacked or packed loosely in tote boxes, on platform trucks or other transportation units for haulage from one part of the plant to another.

Used as Inner Packing: In many cases where transportation hazards require greater outer protection than flexible corrugated can afford, this material is used advantageously as inner-packing in place of excelsior, shredded paper, sawdust, die-cut inner partitions or inner boxes. The cream separator parts shown in Fig. 3 were formerly wrapped in paper and then placed inside the main bowl with shredded paper used for inner packing.

By replacing the paper wrap with flexible corrugated, the shredded paper could be eliminated, producing a cleaner package and eliminating damage through abrasion of the highly polished surfaces.

Saves in Packing Costs: While many manufacturers are turning to flexible corrugated because they are unable to secure containers, they find use of the new material often leads to important savings.

Shipments may run into hundreds or even thousands of different sizes, but it is generally not practical to have an equal number of container sizes. In packing, therefore, a certain percentage of the shipments must be placed in the nearest larger-size container. To make the container fit the shipment, two things can be done: The container can be cut down; or the excess space in the container filled with one of many stuffing or dunnage materials. The requirements of speed and labor costs usually favor the second alternative, thus adding extra space and weight to the shipment and using more material. Using flexible corrugated, the protection can be fitted to the package, reducing the amount of material needed.

Since round or odd-shaped products will not fit exactly into cubical containers, special consideration must be given to these unused areas to prevent the conventional container from breaking down at these points with subsequent damage through shifting of the product. The remedies of heavier containers, special reinforcements such as die-cut inner partitions, or other forms of inner-packing materials mean the use of extra materials as well as extra space. But flexible corrugated permits extra protection to be given to corners or vulnerable points simply by using extra folds of cushioning material at these danger zones, at the same time providing a more exact fitting package.

Comparisons: Fig. 5 shows identical replacement parts as packed in cartons and as packed in Corroflex, suggesting the savings in space and weight which flexible packing makes possible.

While conditions vary greatly, great savings have been reported with flexible packing, in some cases more than 50 per cent on material, time, weight and space.

Uses for the flexible corrugated material are constantly being broadened through the progressive research of packaging engineers on the staff of the Sherman Paper Products Corp., Newton Upper Falls, Mass. The company also publishes data sheets which picture step-by-step operations in packing with Corroflex.

Twenty Days—and An Order on Its Way

From drawing board to truck in 20 days—that was the record time in which eight specially designed 500 kilovolt-ampere, 3-phase, self-cooled Pyranol network transformers were made recently in one of the plants of General Electric Co., Schenectady, N. Y.

Co-ordination was the main factor that made this fast work possible. Working day and night, both engineers and draftsmen prepared a special set of drawings for special approval. Next steel was allocated for both the transformers and switch boxes, and then things began to happen. Coils were wound and treated and tanks fabricated and welded on a co-ordinated schedule. Co-ordinated so all parts were ready for assembly at the same time.

Twenty days after the order was received from Washington, the units were readied for shipment to an important government project.

Coating Substitutes

(*Concluded from Page 76*)

warehoused before painting, if so desired.

Chemical Treatment on Black Sheets: In each of the following cases, it is to be understood that the surface of the sheet must be clean and free from scale, a condition which is usually achieved by standard pickling methods: Hot dip in a balanced aqueous phosphate solution containing an activating agent; cold dip in a solution containing phosphoric acid, phosphates and chromates; hot dip in aqueous chromic acid solution containing an activating agent; phosphoric acid wash after regular standard pickling; standard pickling methods using sulphuric or hydrochloric acid.

The surface of a sheet treated by any one of the first four of the above chemical solutions produces a clean metal surface having a protection suitable for receiving a paint coating. Sheets treated in this manner should not be shipped or warehoused and should be painted as soon as possible after receiving the treatment. A sheet treated by the last-named process will not have a rust-resistant surface; therefore, paint should be applied immediately after the sheet is dried.

Nontreatment of Black Sheets: Under this heading is proposed an untreated black sheet, preferably of cold reduced metal base having surfaces as free from scale and rust as it is practical to secure. It is not to be considered as a substitute for galvanized sheets, but to be used as a base sheet for coating with a competitive low-cost red oxide of iron paint, flash-dried. This is the type of coated sheet that has been commonly made and sold for many years and used mostly for roofing purposes.

In connection with desirable types of paints, considering availability of different ingredients, the following suggestions are made:

Vehicle: A processed oil, fortified with synthetics or water repellents as may be found available. The vehicle seems to narrow down to domestic processed oils with linseed oil predominating. Some synthetic resins may be available throughout the emergency, but from present indications, it appears that these may be restricted to ester gum, treated resins or some of the natural resins.

Pigments: High-grade red oxide of iron, fortified with other materials such as inhibitive pigments that may be found available.

Application: Roller coating with composition roller coating machine is preferred, painting one side of the sheet at one pass through the machine. The thickness of the coating should be from 0.8 to 1.5-mil dry film, giving a coverage of from 300 to 1200 square feet of surface per gallon of paint. Oven-bake drying is recommended at from 15 to 30 minutes at approximately 250 to 350 degrees Fahr. The paint should be continuously agitated during the coating process to keep the pigments in suspension.

The paint used should have a background of four to six years of satisfactory performance. It should have sufficient drying and hardness for stacking, packing and shipping; sufficient elasticity for moderate fabrication; a high degree of protection against the elements, embracing the acknowledged rust inhibitive type of available pigments; and finally, should have a surface appropriate for accepting any and all types of succeeding decorations.

It is also recommended that advisory information be given for recoating of the sheets in the field immediately after application, and that consumers be cautioned to consult their local paint or roofing metal dealers for advice as to the proper field coating of paint.

Outside Uses: For coatings of outside surfaces subject to atmospheric exposure, the following recommendations are made:

Complete removal of scale and treatment of surface by hot or cold dipping in a balanced aqueous phosphate solution containing an activating agent, and coating with an iron oxide base paint reinforced with an alkide type resin and baking for 30 minutes at 350 degrees Fahr. or reinforced with inhibitors such as zinc chromate or zinc oxide.

Complete removal of coarse local scale by wire brushing or flame cleaning and application by brush, dip or spray of a coat of paint, using ordinary iron oxide base paint and linseed oil type vehicle.

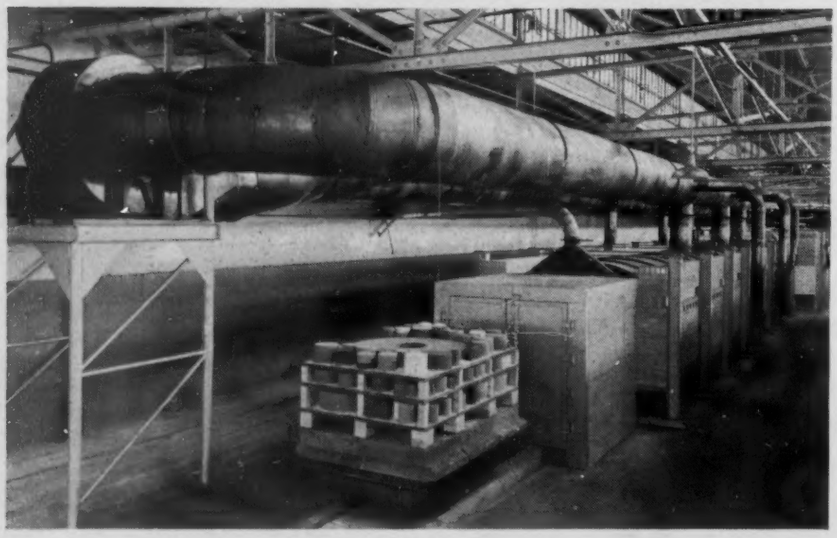
For coating the inside of pipe used in underground water service, coal tar enamels may be used for pipe 4 inches and larger in diameter. No definite recommendation is made for smaller sizes. As a substitute for the above, one paint manufacturer suggested using a lacquer for coating inside surfaces of steel food and liquid containers.

A suggested substitute for an interior zinc coating on building pipe for water service is a low soluble cement which is impervious to water and suitable for use with water below the boiling point.

Recommendations are that all zinc-coated metalware such as tubs, pails, garbage cans and the like be continued with zinc as long as zinc is available. If no zinc is available, then black sheets may be used and either the flat sheets or finished ware coated with available substances to suit each individual case.

Wire: There are no recommendations at this time for substitute coatings for wire products used outdoors. It is the opinion of the committee that such products should be furnished as at present as long as coating metals are available. For inside uses wire can be coated with a black japan or paint designed for the purpose.

New Kiln Makes 30 Per Cent More Grinding Wheels



MOST RECENT expansion at Macklin Co., Jackson, Mich., includes a new building with a continuous kiln shown which will increase production of vitrified grinding wheels by 30 per cent. This and other recent additions make Macklin one of the nation's most modern plants engaged in supplying grinding wheels to meet the needs of our rapidly expanding war production program

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RUN over what you have to do around your plant. What do you have to handle? How does it arrive? Where is it stored? Is it piled up high? Is it heavy? How is it shipped? How have you been trying to answer the problem?

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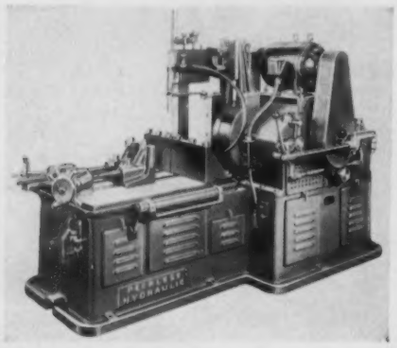
Vertical Cutting Saw

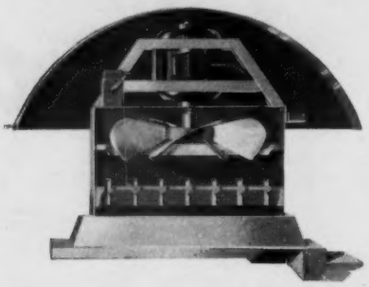
Peerless Machine Co., Racine, Wis., is offering an improved vertical cutting power saw which now is capable of handling extremely large work. To handle such work its work-table has been extended to 35 inches. This permits huge slabs of Hardtem, tool steel, as long as 24 inches and any thickness up to 10 inches to be sawed through without turning the work. Elevating stock rollers on both sides of the work-table facilitate shifting work. These as well as the saw-blade feed pressure, and the blade lift are operated hydraulically. Blade of the ma-



chine travels vertically and is fed back and forth. The 3-speed transmission provides blade speeds of 50, 85 and 125 strokes per minute. By means of an automatic trip gage, it is possible to stop or start cutting action at any point in the work. The machine is powered by a 5-horsepower motor running at 1800 revolutions per minute.

Blackout Ventilator

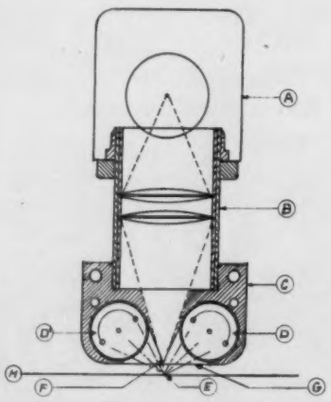
Trane Co., LaCrosse, Wis., has introduced a new blackout ventilator designed especially for blackout plants and for all buildings erected in the modern wartime blackout type of construction. It is available in three basic models—as an exhaust unit, summer supply unit and winter supply unit. All three models are light as well as weather-proof. The summer supply unit provides large volumes of outside air with perceptible air motion at all times. It is especially suited for large industrial plants or where ventilation for particular industrial processes is needed. The exhaust unit has the same general design as the summer unit and, as the name implies, is merely an exhaust fan arrangement whereby the air in occupied areas is exhausted from the building. The winter supply unit is for application in conjunc-



tion with the existing heating system, and contains heating coils, face and bypass dampers and a propeller fan. Maintenance of these units can be accomplished from the rooftop rather than from below with the use of ladders. The hood arrangement hinges upward exposing the motor and blower assembly as well as the damper motor and its linkage. The hood is locked in place in the open position so that wind or other accidental means will not cause it to drop suddenly. It also can be locked in the closed position. Handles are provided for convenience. Capacities of the ventilators range from 1500 to 20,000 cubic feet per minute.

Scanning Unit

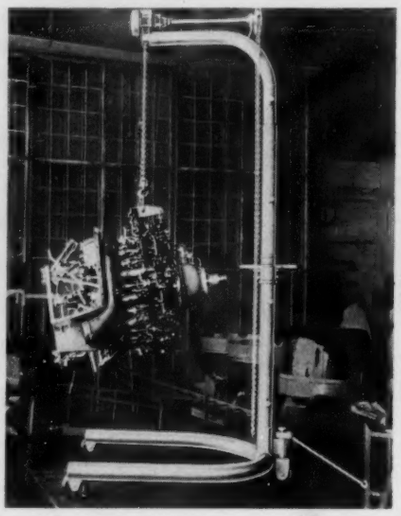
United Cinephone Corp., Torrington, Conn., announces a scanner which can be used wherever photo-electric control is desired from a reflecting surface 2 inches or less from the unit. It consists of a light source and two photo-tubes in a com-



pact housing ready for attachment to any photo-electric amplifying system. Light from the bulb mounted in metal housing A passes through the double converging lens in lens barrel B then through aperture F. A highly concentrated spot of light strikes the surface being scanned H and is reflected back into the photo-tubes, its intensity being dependent upon the reflective quality of the scanned material. Thus, a registration mark on moving paper, or the travel of a meter pointer into the spot of light concentration will cause a change in the illumination reaching photo-tubes D and D'. The response of the photo-tubes to this change in reflected light intensity is transmitted through a co-axial cable to a remote amplifier, making possible the control of auxiliary electrical devices. The unit is sufficiently flexible to operate with any standard sensitive amplifier.

Portable Hoist

Aviation Department, Whiting Corp., Harvey, Ill., announces a new portable Aero hoist of simplified design for the aviation industry. It consists of a single upright mast



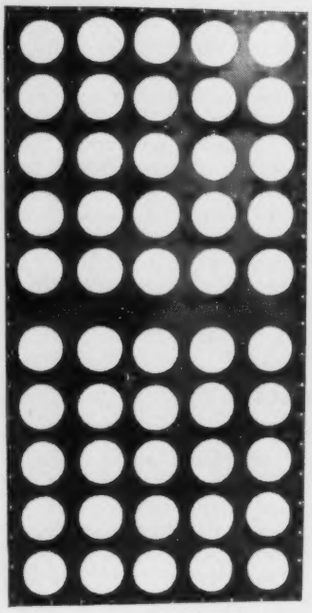
equipped with riser steps and adjustable platform. A chain hoist raises and lowers the work or supports it at any desired height, and an extension keeps the hand chain safely away from the load. A brake locks the hoist in position. The unit is being made in 1 and 2-ton models.

Transit Cranes

Bucyrus-Erie Co., South Milwaukee, Wis., announces two transit cranes, a 10 and 20-ton unit, not only fully convertible from crane to clamshell, dragline, shovel and drag shovel service, but also designed for quick conversion from the wheel mounting to standard crawler mounting. Referred to as the 15-B and the 22-B, these units shorten nonproductive traveling time and step up output. Smaller of the two cranes is the 15-B, with a 10-

Above: Multi-punching a series of bolt holes at one time.

Right: Bending flanges. The same machine punches large holes in plate shown at left.



Another Use for Steelwelds . . .

PUNCHES 5" to 8" HOLES 25 TIMES FASTER!

Steelweld Bending Presses are versatile tools that can be adapted to many kinds of work by simply changing the dies. The same press that bends and forms plate can be set up to punch holes in a few minutes.

One Steelweld Press at the Dracco Corporation, Cleveland, does most of the metal work required in building Dracco dust collectors. It punches 5" to 8" holes singly in 12-gauge and 10-gauge plate, 25 times faster than formerly. It multi-punches 25 or more bolt holes at a time. It bends flanges and performs other forming operations.

This machine has been in continuous operation for more than 5 years without one cent of expense for repairs. It has been a big factor in stepping up production and reducing manufacturing costs at Dracco.

If you work with metal plate, it's to your advantage to have the facts on Steelweld Presses.

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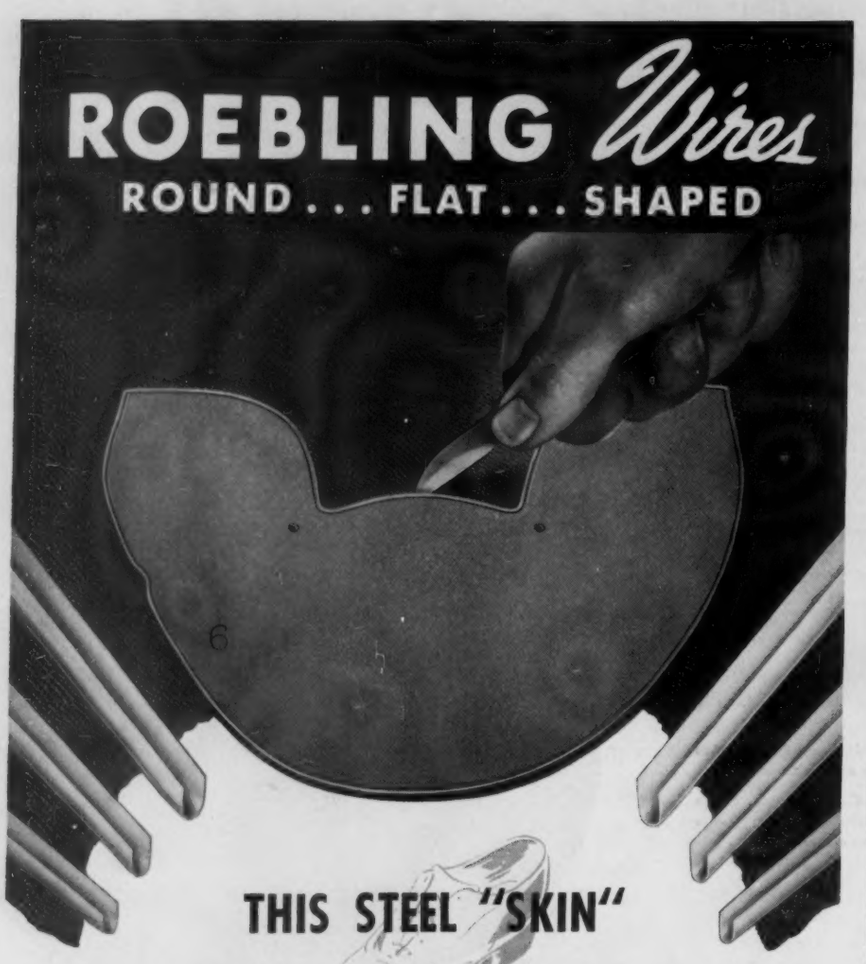


THIS STEEL "SKIN" *guides the knife that fashions your shoes . . .*

ROUND HIGH AND LOW CARBON COMMON AND SPECIALTY WIRES

Hard Drawn, Soft Annealed or Tempered, in all Finishes—Bright, liquor Finish, Coppered, Tinned, Galvanized.

FLAT HIGH AND LOW CARBON AND SPECIALTY WIRES

Hard Rolled, Annealed, Scaleless Tempered; Tempered and Polished, Tempered, Polished and Colored; Various Finishes—Bright, Tinned, Coppered, Hot or Electro Galvanized.

SHAPED WIRES

Various High or Low Carbon Shaped Wires such as: Shaft Casing Wires, I Beam Sections, Space Block Wires, Square, Keystone, Oval, Half Oval, Half Round, etc.

Typical of the special steel wires made by Roebling for specialized uses is this shoe pattern edging. It adheres closely to the "jig saw" outlines of complicated shoe patterns, and guides the knife that cuts the leather.

Whether your wire requirements call for special shapes, special analyses of steel, or unusual tempering or finishing, Roebling can meet them. Roebling experience, personnel and closely controlled steel making facilities solve all the problems of unusual specifications, as you want them solved.

JOHN A. ROEBLING'S SONS COMPANY

TRENTON, NEW JERSEY • Branches and Warehouses in Principal Cities

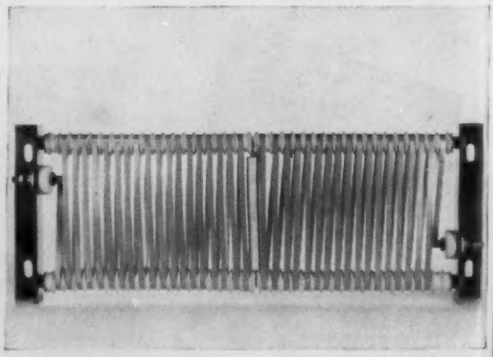
ton maximum crane rating and convertible to ½-yard excavator.

The second unit, the 22-B, has a maximum crane rating of 20 tons and is convertible to a ¾-yard clamshell, dragline, shovel or dragshovel. Wheel mounting of the units consists of an allwelded base giving maximum strength per pound of weight. Tandem rear axle mounted on an equalizer beam assure full

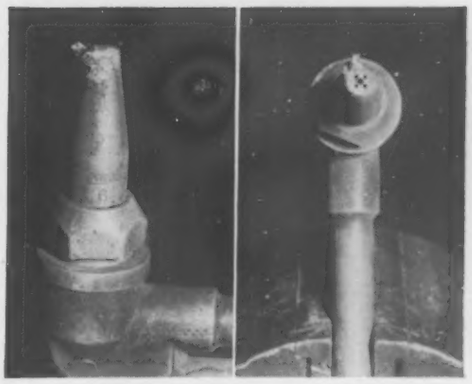
traction over rough grounds. Dual worm drive applies power smoothly. The transmission provides 10 forward and 2 reverse speeds. Use of two engines, one for propeling, the other for handling hoist, swing, etc., simplifies maintenance and repair. Maximum speed on level ground is 27.5 miles per hour for the 15-B and 31 miles per hour for the 22-B. Full-vision cabs are included with comfortable leather seats. The 15-B is equipped with vacuum booster-set air brakes on all four rear wheels and the 22-B carries Westinghouse internal air brakes on the rear wheels.

Air Heater for Ovens

Westinghouse Electric & Mfg. Co., East Pittsburgh, Pa., has introduced a new air heater for ovens or furnaces used in annealing of aluminum, glass and other materials. Designed for temperatures of 750 to 1150 degrees Fahr., it has a heating element consisting of a one-piece nickel-chromium ribbon, spirally wound around heavy porcelain insulators. Its rating is 5

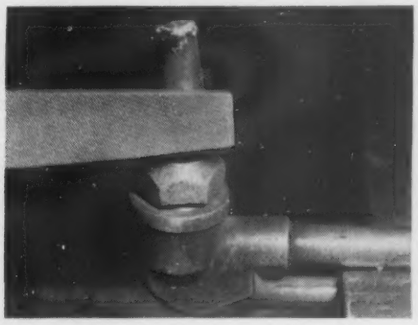


When Oxy-Acetylene Cutting Nozzles Look Like This..*Clean Them*

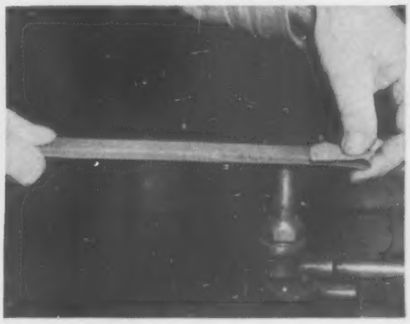


Good results in oxy-acetylene cutting depend upon an accurate flame adjustment, and this requires clean nozzles. In addition to making possible more accurate cutting, correct maintenance will make your nozzles last longer.

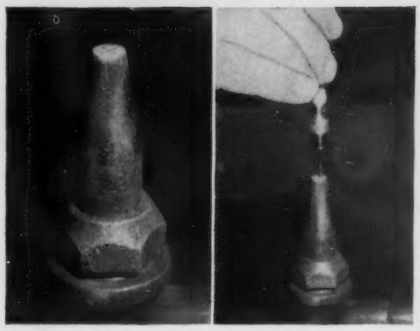
Here's how to do it...



1. Clamp the blowpipe in a vise, inserting a soft material in the jaws to protect the tubes. Knock away loose slag with a file.

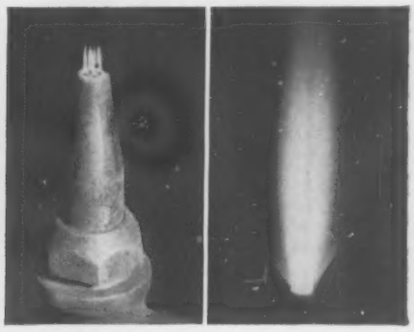


2. Wrap a piece of fine emery cloth around the file and clean the nozzle end so that it is smooth and square.



3. Next take a drill *two sizes smaller* than the size recommended in the instruction booklet furnished with the blowpipe. Work it up and down in the gas orifices. *Do not twist the drill.* Then, using the recommended size drill, repeat this operation.

4. If you do not have the correct sizes of drills, use a piece of copper, or soft brass, wire. A satisfactory substitute drill can be improvised by doubling the wire from a Prest-O-Lite cylinder tag, and then twisting it in a vise until it is tight.



5. After cleaning the nozzle, test the flames by lighting the blowpipe. All of the preheat flames should be the same shape and length, and the cutting oxygen jet should be straight and symmetrical, as shown in the illustrations above.

Instruction Books Available

• You may obtain without charge duplicate copies of the instruction booklets furnished with blowpipes supplied by Linde. Also available is "Precautions and Safe Practices." Write for the copies you need.

THE LINDE AIR PRODUCTS COMPANY

Unit of Union Carbide and Carbon Corporation

UCC

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OXWELD, PREST-O-WELD, PUROX APPARATUS · OXWELD SUPPLIES

The words "Linde," "Prest-O-Lite," "Union," "Oxweld," "Purox," and "Prest-O-Weld" are trade-marks of Units of Union Carbide and Carbon Corporation.

PHOTO APPROVED BY U. S. NAVY DEPT.

SPEEDS DELIVERY OF RANGE FINDERS FOR THE NAVY

At the Bausch and Lomb Optical Company plant this 8-ton Reading Crane is helping to speed deliveries of one of the Navy's newest and most powerful weapons . . . range finders for the big guns of the fleet.

Right now, this motor-driven Reading Crane is typical of many that are working in defense plants to speed the production and distribution of vital wartime products. In many cases Reading equipment that was originally installed to meet normal production needs is "doubling up" to carry the extra burden of speed to meet wartime needs.

Remember that when *results* and *savings* are in the specifications . . . it pays to rely on Reading's engineering ability.

READING CHAIN & BLOCK CORP.
DEPT. D-3 READING, PA.

READING
Chain Hoists, Electric Hoists, Cranes and Monorails

kilowatts for operation on 220-volt circuits. The complete heater is only 2½ inches thick and requires a space 12 x 33 inches for mounting.

Bench Accessories

Lyon Metal Products Inc., Clark street, Aurora, Ill., announces several new and improved accessories on its heavy-duty steel work

benches. Each basic bench may be equipped with single drawer, 2 or 3-shift drawer units for multiple shift operations, half-depth shelf, full-depth shelf, back and end stops, foot rest or full length bench riser. Channel-type stringer illustrated is used only when bench has no shelf. Shelves and stringer are of one piece for added strength and rigidity.

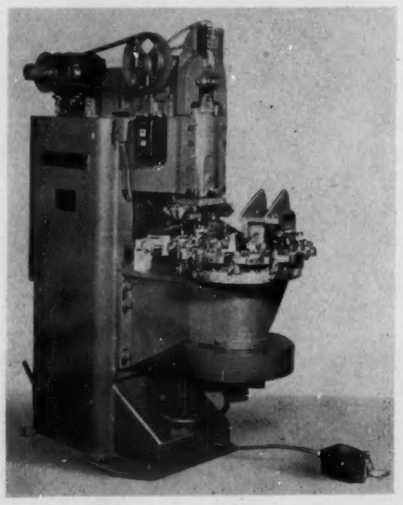
Abrasive Belt Surfacer

Hammond Machinery Builders Inc., 1611 Douglas avenue, Kalamazoo, Mich., has introduced a new 600 Dri-N-Wet abrasive belt surfacer which can be adjusted from vertical to horizontal position while running. Its belt tension and tracking device likewise can be adjusted while running, this being ac-

complished quickly by two handles. The machine is totally enclosed for safety. It is arranged for an individual dust collector or for connection to an exhaust system. The abrasive belt pulleys are of cast iron and are dynamically balanced. Work table of the surfacer which is offered either as a bench or floor model, can be adjusted to any desired working angle. Unit illustrated, floor model, has all the features of the company's 600 Dri plus providing wet operation for grinding, polishing or surfacing. It is equipped with tank and pump unit and also can be equipped for water main connection only.

Resistance Welder

Thomson-Gibb Co., Lynn, Mass., announces a new resistance welding machine designed to attach a base plate or sealing disk to the base of aircraft, anti-aircraft and artillery shell. It produces a seal by making a projection weld around the entire outer edge of the disk—a method of avoiding danger of possible leak-



age through the shell which might cause premature explosion. The machine basically consists of a motor-driven welding press powered by a 75-kilovolt-ampere transformer equipped with a 10-station automatic dial feed. The operator loads the shell and disks by hand, but thereafter operation is entirely automatic, including ejection of the welded shell upon a chute or conveyor.

The weld made is gas and flame-tight and is made by a ring projection on the disk which welds to the flat end of the shell. Accurate position is insured by a clamping mechanism which locates the shell and disk and applies a positive gripping action as each station reaches welding position. A tripping device opens and clamps and ejects the welded shell before each station returns to the loading position. The machine is water cooled by separate circuits to the transformer, projection welding electrode and lower terminal block. Its upper electrode is mounted on a low-inertia rubber-cushioned block which provides self-alignment and quick follow up.

CAN YOU IMPROVE ON THE PAPER CLIP?

Hundreds of "gadgets" have failed to measure up in usefulness to the simple principle of the paper clip. Just as scores of "gadgets" for locking a bearing to its shaft have failed to measure up to the Fafnir Wide Inner Ring Ball Bearing with Self-Locking Collar. Bored to inch dimensions, for slip fit on stock shafting, it requires no lock-nuts, adapters, shaft shoulders, or precise machining; it locks to the shaft with just a finger-twist.

This time-saving feature is built into every transmission unit in the complete Fafnir line. It's simple, positive, dependable . , . and exclusively Fafnir. The Fafnir Bearing Company, New Britain, Conn.

Slip the shaft through the bearing.
Lock the collar with a finger-twist.
Set the screw to hold collar locked.

FAFNIR
Ball Bearings
THE BALANCED LINE
MOST COMPLETE IN AMERICA

THERE'S A WHALE OF A DIFFERENCE between Two Peas in a Pod

Two bearing balls ground and polished to the same measurements may look – and caliper – exactly alike. But there still may be hundred-thousandths of difference between them – enough so they don't deserve to work together in a bearing marked "Fafnir." * * * That is why, before final assembly, Fafnir inspectors gauge these polished balls between narrowing walls of polished steel. The balls thus group themselves into matched "teams" as exactly alike as 1942 precision methods can make them . . . each team slated for many winning seasons in a hard-working, dependable Fafnir Ball Bearing. The Fafnir Bearing Company, New Britain, Conn.

FAFNIR

Ball Bearings

THE BALANCED LINE
MOST COMPLETE IN AMERICA

Power Distribution

(*Concluded from Page 76*)

centers associated with different primary feeders. Electrical faults in primary feeders or transformers are removed automatically without secondary service interruption.

Cable: About 75 per cent of the material saved by the load-center distribution system is due to reduction in cable required. A conventional radial system that requires 94,000 pounds of material can be replaced by a load-center system with only 73,000 pounds. Some 17,000 pounds of this saving is cable. Both systems were calculated using the new type varnished-cambric interlocked-armor cable which reduces by about 2½ times the amount of material required for either system compared with conventional wire and conduit installations. In the example above, the 25,000 pounds of copper, steel, rubber and other materials for a conventional wire and conduit job are replaced by only 7000 pounds of material on an equivalent interlocked-armor cable installation (load-center circuit system).

If this same example were wired using a conventional radial distribution system and with wire and conduit, some 67,000 pounds of material would be needed. This total could be reduced to but 24,000 pounds if interlocked-armor cable were used, illustrating the importance of this type of wiring. In interlocked-armor cable, the copper conductors are each insulated with varnished cambric, stranded together with treated jute fillers and the assembly wrapped with rubber-filled tape and a single braid of cotton saturated with a flame and moisture-resisting finish. Over all is a flexible, interlocked armor of galvanized steel tape, the final barrier to any mechanical damage.

Automatic Welding

(*Concluded from Page 92*)

Recently one shipbuilder found it was possible to produce as many as 76 plug welds per hour with one portable welding machine, fastening ½-inch tank top plating to the flanges of angle-iron supporting structures. Fig. 7 shows a typical section of a plug weld. Simple, lightweight, hand-operated equipment has recently been introduced to facilitate plug welding.

With all methods of welding, cleanliness of plate edges and weldability of material are vital to success. Manual metallic arc welds are often made with fair success but with questionable economy on plate which is wet, oily or dirty. Such conditions usually are not tolerated.

In Unionmelt welding, freedom from gas-forming contaminants in the fusion zone is particularly important because of the unusually high welding speeds and the resulting rapid rates of initial cooling of relatively large volumes of molten metal in the weld. Contaminating materials such as water, oil, paint, heavy scale and rust are usually removed by wire brushing or rapid surface heating with a concentrated oxyacetylene flame. If the plates are carefully protected and the work of assembly and welding is properly organized, a light wire-brushing just before welding will be the only surface preparation needed.

Steel of questionable weldability is occasionally encountered in shipyards, and has sometimes required special procedures. Care in assembling and cleaning, slower speeds, higher quality welding materials, or perhaps additional passes of welding, tend to improve the results regardless of the method of welding being used.

Shipbuilders have shown keen interest in Unionmelt welding, though the process is relatively new. Its production rate is high; long training periods are not necessary for operators of the equipment; the investment cost is reasonable, and operating costs are attractive.

LARGE FACILITIES AVAILABLE FOR IMMEDIATE VOLUME PRODUCTION

OF ANY OR ALL OF THESE ITEMS ➡

★ WELDED STEEL TUBES AND TUBING in diameters from ¾" to 5" and in gauges up to ¼".

★ FABRICATED STEEL TUBULAR PARTS AND WELDED ASSEMBLIES.

★ LARGE AND SMALL STEEL STAMPINGS.

★ FORGED AND UPSET PARTS FROM 2", 3", 4", 5" upsetters.

For 24 years the American Metal Products Company has been a volume producer of parts and equipment for the automobile, truck and allied industries.

During this period our expansion and growth have been such that we now occupy a completely modern 5-acre plant erected only 4 years ago. At peak volume our force of engineers, production men and craftsmen totals 800—all men who have been trained for years in meeting the exacting demands and volume requirements of the automobile industry.

Because of curtailed production of automobiles and trucks, the plant, facilities and manpower of American Metal Products Company are available for immediate volume production, on a sub-contract or co-contract basis, on any or all of the items listed at the right.

For further details as to how we can fit into your production requirements write, wire or phone

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Don't Gamble— with Your Cutting Tools

Grind Safely with NORTON WHEELS

WAR time is no time to take chances with hard-to-replace cutting tools. The stakes are too important NOW—cutting tools must be sharpened carefully and correctly for two important reasons: 1. so each tool will deliver maximum life, 2. so each tool will perform at maximum efficiency on its machine. You can't afford to take chances with your grinding wheels or your grinding methods.

When you specify Norton Tool Wheels you know you are eliminating the gamble. You are getting wheels developed by Norton research especially for tool room service. You are getting wheels made by skilled Norton workmen using the most modern manufacturing facilities. And Norton engineers will be glad to help you select the proper wheels for your particular tool room jobs—"B-E" bond Alundum wheels for high speed steels and Stellite, Crystolon vitrified wheels and two types of diamond wheels for the cemented carbides.

"A Handbook on Tool Room Grinding"—177 pages of helpful information on wheel selection and use. Write for a copy mentioning STEEL

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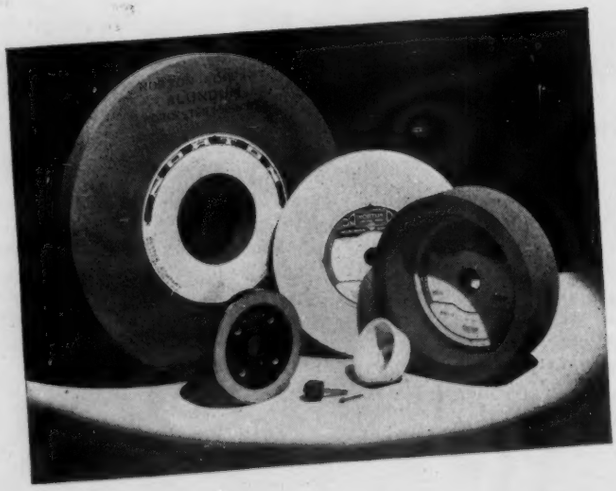
Worcester, Mass.

Distributors in All Principal Cities



W-860

NORTON ABRASIVES

High Priorities Rule Steelmakers' Books

Plate deliveries better as strip mills increase output. Ore season in earliest start in history. Scrap still bottleneck

MARKET IN TABLOID ★

Demand
War needs predominate.

Prices
Steady at ceilings.

Production
Steady at 95½ per cent.

BY FAR the greater part of steel orders on mill books is concentrated in upper priority brackets, shipments on ratings below A-1-b being slowed up and mills as a rule accepting no new commitments lower than A-1-j.

Plates are most in demand but the situation has been bettered in recent weeks and most essential needs are being met closer to schedule. Much relief is being afforded as plates from strip mills come out in larger tonnage. Revamping of plate shipping schedules for shipbuilding is under way, reassigning to strip mills some tonnage formerly allocated to sheared and universal mills. Bars are a close second in demand and congestion is increased by the variety of products demanded from bar mills.

As a result of closer supervision of inventory under new regulations of the War Production Board plate shipments have been stopped temporarily to shops of three railroads which had accumulated what was regarded as excessive inventory. This is regarded as the forerunner of other similar orders. Some inventory increase frequently results from failure to receive other steel needed to complete an assembly and in those cases no blame attaches, though further shipment may be held back.

Part of the iron ore fleet left lower lake ports last week, the earliest in history, and ice breakers are opening channels to Escanaba and Lake Superior ports, in the effort to start ore movement. With war demand increasing, the need for ore will be greater than last year and a record tonnage is needed. Weather conditions favor the early start and several million tons above last year's total is sought.

New freight rates, carrying a 6 per cent increase, went into effect last week on interstate shipments. Application to intrastate shipments has not been complete, some railroad commissions delaying action. New York made the increase effective last week and New Jersey will follow immediately. Indiana probably will put the rates into effect March 24 and Illinois April 13, under present plans.

Refusal of Interstate Commerce Commission to suspend the rate increase on scrap and other commodities, as requested by the Office of Price Administration, has caused the latter to amend the scrap schedule to permit addition of 6 per cent of the allowable freight charges where the ceiling is at point of delivery. This is to obviate a downward adjustment of prices by shippers, which the price administrator believed would tend to impede free flow of scrap into industrial production. On cast iron scrap other than railroad scrap when the ceiling is at basing points, increased transportation charges may be included also.

Semifinished steel requirements for war purposes are taxing integrated companies and mills relying on others for their supply find deliveries lengthening. As the latter have heavy orders with high priority the situation is becoming complicated. This applies in practically all products, bars, sheets, pipe and wire being especially affected. Semifinished producers find it difficult to follow priorities and must rely on special directives to move any order holding up vital war production. With a preponderance of A-1 preferences on books of all finishing mills, integrated or not, it is difficult to apportion raw material with exact relation to needs.

Steelworks operations last week held unchanged at 95½ per cent of capacity. Chicago gained 1 point to 104 per cent, only ½-point under the all-time high in December. Cincinnati increased 7 points to 87 per cent as a plant down for repairs resumed production. New England lighted its last open hearth for a rise of 5 points to 100 per cent. Youngstown gained 1 point to 95 per cent. Pittsburgh lost 1 point to 94 per cent. Detroit 4 points to 83 and St. Louis ½-point to 83. Rates were unchanged at eastern Pennsylvania, 88 per cent; Cleveland, 91; Buffalo 79½; Birmingham, 95; Wheeling 81½ per cent.

With most steel production limited to high preference war needs many former steel uses are being replaced by wood as the only means of supplying the deficiency. Increasingly water tanks are being redesigned for timber construction and even rated war projects where wood can be used are being changed to that material to save steel for actual war requirements, as well as to speed completion.

Composite prices reflect the unchanged ceilings applying to steel and iron products, finished steel at $56.73, semifinished steel at $36.00, steelmaking pig iron $23.05 and steelmaking scrap $19.17.

COMPOSITE MARKET AVERAGES

	Mar. 21	Mar. 14	Mar. 7	One Month Ago Feb., 1942	Three Months Ago Dec., 1941	One Year Ago Mar., 1941	Five Years Ago Mar., 1937
Finished Steel	$56.73	$56.73	$56.73	$56.73	$56.73	$56.73	$60.14
Semifinished Steel	36.00	36.00	36.00	36.00	36.00	36.00	39.24
Steelmaking Pig Iron	23.05	23.05	23.05	23.05	23.05	23.05	22.10
Steelmaking Scrap	19.17	19.17	19.17	19.17	19.17	20.15	21.25

Finished Steel Composite:—Average of industry-wide prices on sheets, strip, bars, plates, shapes, wire, nails, tin plate, standard and line pipe. Semifinished Steel Composite:—Average of industry-wide prices on billets, slabs, sheet bars, skelp and wire rods. Steelmaking Pig Iron Composite:—Average of basic pig iron prices at Bethlehem, Birmingham, Buffalo, Chicago, Cleveland, Neville Island, Granite City and Youngstown. Steelworks Scrap Composite:—Average of No. 1 heavy melting steel prices at Pittsburgh, Chicago and eastern Pennsylvania.

COMPARISON OF PRICES

Representative Market Figures for Current Week; Average for Last Month, Three Months and One Year Ago

Finished Material

	Mar. 21, 1942	Feb. 1942	Dec. 1941	Mar. 1941
Steel bars, Pittsburgh	2.15c	2.15c	2.15c	2.15c
Steel bars, Chicago	2.15	2.15	2.15	2.15
Steel bars, Philadelphia	2.47	2.47	2.47	2.47
Shapes, Pittsburgh	2.10	2.10	2.10	2.10
Shapes, Philadelphia	2.215	2.215	2.215	2.215
Shapes, Chicago	2.10	2.10	2.10	2.10
Plates, Pittsburgh	2.10	2.10	2.10	2.10
Plates, Philadelphia	2.15	2.15	2.15	2.225
Plates, Chicago	2.10	2.10	2.10	2.10
Sheets, hot-rolled, Pittsburgh	2.10	2.10	2.10	2.10
Sheets, cold-rolled, Pittsburgh	3.05	3.05	3.05	3.05
Sheets, No. 24 galv., Pittsburgh	3.50	3.50	3.50	3.50
Sheets, hot-rolled, Gary	2.10	2.10	2.10	2.10
Sheets, cold-rolled, Gary	3.05	3.05	3.05	3.05
Sheets, No. 24 galv., Gary	3.50	3.50	3.50	3.50
Bright bess., basic wire, Pitts.	2.60	2.60	2.60	2.60
Tin plate, per base box, Pitts.	$5.00	$5.00	$5.00	$5.00
Wire nails, Pittsburgh	2.55	2.55	2.55	2.55

Semifinished Material

Sheet bars, Pittsburgh, Chicago	$34.00	$34.00	$34.00	$34.00
Slabs, Pittsburgh, Chicago	34.00	34.00	34.00	34.00
Rerolling billets, Pittsburgh	34.00	34.00	34.00	34.00
Wire rods No. 5 to ⅜-inch, Pitts.	2.00	2.00	2.00	2.00

Pig Iron

	Mar. 21, 1942	Feb. 1942	Dec. 1941	Mar. 1941
Bessemer, del. Pittsburgh	$25.34	$25.34	$25.34	$25.34
Basic, Valley	23.50	23.50	23.50	23.50
Basic, eastern, del. Philadelphia	25.34	25.34	25.34	25.34
No. 2 fdry., del. Pgh., N.&S. Sides	24.69	24.69	24.69	24.69
No. 2 foundry, Chicago	24.00	24.00	24.00	24.00
Southern No. 2, Birmingham	20.38	20.38	20.38	20.38
Southern No. 2, del. Cincinnati	24.06	24.06	24.06	24.06
No. 2X, del. Phila. (differ. av.)	26.215	26.215	26.215	26.215
Malleable, Valley	24.00	24.00	24.00	24.00
Malleable, Chicago	24.00	24.00	24.00	24.00
Lake Sup., charcoal, del. Chicago	31.34	31.34	31.34	30.34
Gray forge, del. Pittsburgh	24.19	24.19	24.19	24.18
Ferromanganese, del. Pittsburgh	125.33	125.33	125.33	125.33

Scrap

Heavy melting steel, Pitts.	$20.00	$20.00	$20.00	$20.75
Heavy melt. steel, No. 2, E. Pa.	18.75	18.75	18.00	18.65
Heavy melting steel, Chicago	18.75	18.75	18.75	19.45
Rails for rolling, Chicago	22.25	22.25	22.25	24.00
No. 1 cast, Chicago	20.00	20.00	21.20	20.25

Coke

Connellsville, furnace, ovens	$6.25	$6.25	$6.25	$5.50
Connellsville, foundry, ovens	7.25	7.25	7.25	6.00
Chicago, by-product fdry., del.	12.25	12.25	12.25	11.75

STEEL, IRON, RAW MATERIAL, FUEL AND METALS PRICES

Following are maximum prices established by OPA Schedule No. 6 issued April 16, 1941, revised June 20, 1941 and Feb. 4, 1942. The schedule covers all iron or steel ingots, all semifinished iron or steel products, all finished hot-rolled, cold-rolled iron or steel products and any iron or steel product which is further finished by galvanizing, plating, coating, drawing, extruding, etc., although only principal established basing points for selected products are named specifically. All seconds and off-grade products also are covered. Exceptions applying to invidividual companies are noted in the table.

Semifinished Steel

Gross ton basis except wire rods, skelp

Carbon Steel Ingots: F.o.b. mill base, rerolling qual., stand. analysis, $31.00
(Empire Sheet & Tin Plate Co., Mansfield, O., may quote carbon steel ingots at $33 gross ton, f.o.b. mill.)

Alloy Steel Ingots: Pittsburgh base, uncropped, $45.00.

Rerolling Billets, Slabs: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Sparrows Point, Birmingham, Youngstown, $34.00; Detroit, del. $36.00; Duluth (bil.) $36.00.
(Wheeling Steel Corp. allocated 21,000 tons 2" square, base grade rerolling billets under lease-lend during first quarter 1942 at $37, f.o.b. Portsmouth, O.; Andrews Steel Co. may quote carbon steel slabs $41 gross ton at established basing points.)

Forging Quality Billets: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham, Youngstown, $40.00; Detroit, del. $42.00; Duluth, $42.00.
(Andrews Steel Co. may quote carbon forging billets $50 gross ton at established basing points.)

Open Hearth Shell Steel: Pittsburgh, Chicago, base 1000 tons one size and section: 3-12 in., $52.00; 12-18 in., $54.00; 18 in. and over, $56.00.

Alloy Billets, Slabs, Blooms: Pittsburgh, Chicago, Buffalo, Bethlehem, Canton, Massillon, $54.00.

Sheet Bars: Pittsburgh, Chicago, Cleveland, Buffalo, Canton, Sparrows Point, Youngstown, $34.00.
(Empire Sheet & Tin Plate Co., Mansfield, O., may quote carbon steel sheet bars at $39 gross ton, f.o.b. mill.)

Skelp: Pittsburgh, Chicago, Sparrows Pt., Youngstown, Coatesville, lb., $1.90.

Wire Rods: Pittsburgh, Chicago, Cleveland, Birmingham, No. 5—9/32 in., inclusive, per 100 lbs., $2.00.
Do., over 9/32—47/64-in., incl., $2.15. Worcester add $0.10 Galveston, $0.25. Pacific Coast $0.50 on water shipment.

Bars

Hot-Rolled Carbon Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, Birmingham, base 20 tons one size, 2.15c; Duluth, base 2.25c; Detroit, del. 2.25c; New York del. 2.51c; Phila. del. 2.49c; Gulf Ports, dock 2.50c, all-rail 2.59c; Pac. ports, dock 2.80c; all-rail 3.25c.
(Phoenix Iron Co., Phoenixville, Pa., may quote 2.35c at established basing points.)

Rail Steel Bars: Same prices as for hot-rolled carbon bars except base is 5 tons.
(Sweet's Steel Co., Williamsport, Pa., may quote rail steel merchant bars 2.33c f.o.b. mill; W. Ames & Co., Jersey City, N. J., may quote 2.85c, f.o.b. mill for 10 tons or over.)

Hot-Rolled Alloy Bars: Pittsburgh, Chicago, Canton, Massillon, Buffalo, Bethlehem, base 20 tons one size, 2.70c Detroit 2.80c.

S.A.E.	Alloy Diff.	S.A.E.	Alloy Diff.
2000	0.35	5100 Spr. flats	0.15
2100	0.75	5100 80-1.10 Cr.	0.45
2300	1.70	6100 Bars	1.20
2500	2.55	6100 Spr. flats	0.85
3100	0.70	Carb., Van.	0.85
3200	1.35	9200 Spr. flats	0.15
3300	3.80	9200 Spr. rounds, squares	0.40
3400	3.20	T 1300, Mn, mean 1.51-2.00	0.10
4100 .15-25 Mo. 46.00 .20-.30 Mo. 1.50-2.00; Ni.	0.55 1.20	Do., carbon under 0.20 max.	0.35

Cold-Finished Carbon Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base 20,000-39,999 lbs., 2.65c; Detroit 2.70.

Cold-Finished Alloy Bars: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base 3.35c; Detroit 3.45c; Galveston, add $0.25, Pacific Coast $0.50.

Turned, Ground Shafting: Pittsburgh, Chicago, Gary, Cleveland, Buffalo, base (not including turning, grinding, polishing extras) 2.65c; Detroit 2.70c.

Reinforcing Bars (New Billet): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Sparrows Point, Buffalo, Youngstown, base 2.15c; Detroit del. 2.25c; Gulf ports, dock 2.50c, all-rail 2.59c; Pacific ports, dock 2.80c, all-rail 3.25c.

Reinforcing Bars (Rail Steel): Pittsburgh, Chicago, Gary, Cleveland, Birmingham, base 2.15c; Detroit, del. 2.25c; Gulf ports, dock 2.50c, all-rail 2.59c; Pacific ports, dock 2.80c, all-rail 3.25c.
(Sweet's Steel Co., Williamsport, Pa., may quote rail steel reinforcing bars 2.33c, f.o.b. mill; W. Ames & Co., Jersey City, N. J., may quote 2.85c, f.o.b. mill, for 10 tons or over.)

Iron Bars: Single refined, Pitts. 4.40c, double refined 5.40c; Pittsburgh, staybolt, 5.75c; Terre Haute, common, 2.15c.

Sheets, Strip

Hot-Rolled Sheets: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Buffalo, Youngstown, Sparrows Pt., Middletown, base 2.10c; Granite City, base 2.20c; Detroit del. 2.20c; Phila. del. 2.28c; New York del., 2.34c Pacific ports 2.65c.
(Andrews Steel Co. may quote hot-rolled sheets for shipment to Detroit and the Detroit area on the Middletown, O. base.)

Cold-Rolled Sheets: Pittsburgh, Chicago, Cleveland, Gary, Buffalo, Youngstown, Middletown, base, 3.05c; Granite City, base 3.15c; Detroit del. 3.15c; New York del. 3.41c; Phila. del. 3.39c; Pacific ports, 3.70c.

Galvanized Sheets, No. 24: Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Youngstown, Sparrows Point, Middletown, base 3.50c; Granite City, base 3.60c; New York del. 3.75c; Phila. del. 3.68c; Pacific ports 4.05c.
(Andrews Steel Co. may quote galvanized sheets 3.75c at established basing points.)

Corrugated Galv. Sheets: Pittsburgh, Chicago, Gary, Birmingham, 29 gage, per square 3.31c.

Culvert Sheets: Pittsburgh, Chicago, Gary, Birmingham, 16 gage, not corrugated, copper alloy 3.60c; copper iron 3.90c, pure iron 3.95c;

zinc-coated, hot-dipped, heat-treated, No. 24, Pittsburgh 4.25c.

Enameling Sheets: Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, 10 gage, base 2.75c; Granite City, base 2.85c; Pacific ports 3.40c.

Pittsburgh, Chicago, Gary, Cleveland, Youngstown, Middletown, 20 gage, base 3.35c; Granite City, base 3.45c; Pacific ports 4.00c.

Electrical Sheets, No. 24:

	Pittsburgh Base	Pacific Ports	Granite City
Field grade	3.20c	3.95c	3.30c
Armature	3.55c	4.30c	3.65c
Electrical	4.05c	4.80c	4.15c
Motor	4.95c	5.70c	5.05c
Dynamo	5.65c	6.40c	5.75c
Transformer			
72	6.15c	6.90c	.....
65	7.15c	7.90c	.....
58	7.65c	8.40c	.....
52	8.45c	9.20c	.....

Hot-Rolled Strip: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Middletown, base, 1 ton and over, 12 inches wide and less 2.10c; Detroit del. 2.20c; Pacific ports 2.75c.

Cold Rolled Strip: Pittsburgh, Cleveland, Youngstown, 0.25 carbon and less 2.80c; Chicago, base 2.90c; Detroit, del. 2.90c; Worcester base 3.00c.

Commodity C. R. Strip: Pittsburgh, Cleveland, Youngstown, base 3 tons and over, 2.95c; Worcester base 3.35c.

Cold-Finished Spring Steel: Pittsburgh, Cleveland bases, add 20c for Worcester; .26-.50 Carb., 2.80c; .51-.75 Carb., 4.30c; .76-1.00 Carb., 6.15c; over 1.00 Carb., 8.35c.

Tin, Terne Plate

Tin Plate: Pittsburgh, Chicago, Gary, 100-lb. base box, $5.00; Granite City $5.10.

Tin Mill Black Plate: Pittsburgh, Chicago, Gary, base 29 gage and lighter, 3.05c; Granite City, 3.15c; Pacific ports, boxed 4.05c.

Long Ternes: Pittsburgh, Chicago, Gary, No. 24 unassorted 3.80c.

Manufacturing Ternes: Pittsburgh, Chicago, Gary, 100-base box $4.30; Granite City $4.40.

Roofing Ternes: Pittsburgh base per package 112 sheets, 20 x 28 in., coating I.C., 8-lb. $12.00; 15-lb. $14.00; 20-lb. $15.00; 25-lb. $16.00; 30-lb. $17.25; 40-lb. $19.50.

Plates

Carbon Steel Plates: Pittsburgh, Chicago, Gary, Cleveland, Birmingham, Youngstown, Sparrows Point, Coatesville, Claymont, 2.10c; New York, del., 2.30-2.55c; Phila., del., 2.15c; St. Louis, 2.34c; Boston, del., 2.42-67c; Pacific ports, 2.65c; Gulf Ports, 2.45c.

(Central Iron & Steel Co. may quote carbon steel plates at 2.35c at established basing points; Granite City Steel Co. may quote ship plates 2.25c, f.o.b. mill.)

Floor Plates: Pittsburgh, Chicago, 3.35c; Gulf ports, 3.70c; Pacific ports, 4.00c.

Open-Hearth Alloy Plates: Pittsburgh, Chicago, Coatesville, 3.50c.

Wrought Iron Plates: Pittsburgh, 3.80c.

Shapes

Structural Shapes: Pittsburgh, Chicago, Gary, Birmingham, Buffalo, Bethlehem, 2.10c; New York, del., 2.28c Phila., del., 2.22c; Gulf ports, 2.45c; Pacific ports, 2.75c.

(Phoenix Iron Co., Phoenixville, Pa. may quote carbon steel shapes at 2.30c at established basing points.)

Steel Sheet Piling: Pittsburgh, Chicago, Buffalo, 2.40c.

Wire Products, Nails

Wire: Pittsburgh, Chicago, Cleveland, Birmingham (except spring wire) to manufacturers in carloads (add $2 for Worcester):

Bright basic, bessemer wire	2.60c
Galvanized wire	2.60c
Spring wire	3.20c

Wire Products to the Trade:

Standard and cement-coated wire nails, polished and staples, 100-lb. keg	$2.55
Annealed fence wire, 100 lb.	3.05
Galvanized fence wire, 100 lb.	3.40
Woven fence, 12½ gage and lighter, per base column	67
Do., 11 gage and heavier	70
Barbed wire, 80-rod spool, col.	70
Twisted barbless wire, col.	70
Single loop bale ties, col.	59
Fence posts, carloads, col.	69
Cut nails, Pittsburgh, carloads	$3.85

Pipe, Tubes

Welded Pipe: Base price in carloads to consumers about $200 per net ton. Base discounts on steel pipe Pittsburgh and Lorain, O.; Gary, Ind. 2 points less on lap weld, 1 point less on butt weld. Pittsburgh base only on wrought iron pipe.

Butt Weld

In.	Steel Blk.	Steel Galv.	In.	Iron Blk.	Iron Galv.
⅛	56	33	½	24	3½
¼ & ⅜	59	40½	¾	30	10
½	63½	51	1-1¼	34	16
¾	66½	55	1½	38	18½
1-3	68½	57½	2	37½	18

Lap Weld

In.	Steel Blk.	Steel Galv.	In.	Iron Blk.	Iron Galv.
2	61	49½	1¼	23	3½
2½-3	64	52½	1½	28½	10
3½-6	66	54½	2	30½	12
7-8	65	52½	2½, 3½	31½	14½
9-10	64½	52	4	33½	18
11-12	63½	51	4½-8	32½	17
			9-12	28½	12

Boiler Tubes: Net base prices per 100 feet, f.o.b. Pittsburgh in carload lots, minimum wall, cut lengths 4 to 24 feet, inclusive.

O. D. Sizes	B.W.G.	—Seamless— Hot Rolled	Cold Drawn	—Lap Weld— Steel	Charcoal Iron
1"	13	$ 7.82	$ 9.01	.....	.....
1¼"	13	9.26	10.67	.....	.....
1½"	13	10.23	11.72	$ 9.72	$23.71
1¾"	13	11.64	13.42	11.06	22.93
2"	13	13.04	15.03	12.38	19.35
2¼"	13	14.54	16.76	13.79	21.63
2½"	12	16.01	18.45	15.16	.....
2½"	12	17.54	20.21	16.58	26.57
2¾"	12	18.59	21.42	17.54	29.00
3"	12	19.50	22.48	18.35	31.38
3½"	11	24.63	28.37	23.15	39.81
4"	10	30.54	35.20	28.66	49.90
4½"	10	37.35	43.04	35.22	.....
5"	9	46.87	54.01	44.25	73.93
6"	7	71.96	82.93	68.14	.....

Rails, Supplies

Standard rails, over 60-lb., f.o.b. mill, gross ton, $40.00.

Light rails (billet), Pittsburgh, Chicago, Birmingham, gross ton, $40.00.

*Relaying rails, 35 lbs. and over, f.o.b. railroad and basing points, $28-$30.

Supplies: Angle bars, 2.70c; tie plates, 2.15c; track spikes, 3.00c; track bolts, 4.75c; do. heat treated, 5.00c.

*Fixed by OPA Schedule No. 46, Dec. 15, 1941.

Tool Steels

Tool Steels: Pittsburgh, Bethlehem, Syracuse, base, cents per lb.: Reg. carbon 14.00c; extra carbon 18.00c; special carbon 22.00c; oil-hardening 24.00c; high car.-chr. 43.00c.

High Speed Tool Steels:

Tung.	Chr.	Van.	Moly.	Pitts. base, per lb.
18.00	4	1	..	67.00c
18.00	4	2	1	77.00c
18.00	4	3	1	87.00c
1.5	4	1	8.5	54.00c
.....	4	2	8	54.00c
5.50	4	1.50	4	57.50c
5.50	4.50	4	4.50	70.00c

Stainless Steels

Base, Cents per lb.—f.o.b. Pittsburgh

CHROMIUM NICKEL STEEL

Type	Bars	Plates	Sheets	H. R. Strip	C. R. Strip
302	24.00c	27.00c	34.00c	21.50c	28.00c
303	26.00	29.00	36.00	27.00	33.00
304	25.00	29.00	36.00	23.50	30.00
308	29.00	34.00	41.00	28.50	35.00
309	36.00	40.00	47.00	37.00	47.00
310	49.00	52.00	53.00	48.75	56.00
311	49.00	52.00	53.00	48.75	56.00
312	36.00	40.00	49.00	.....	.....
*316	40.00	44.00	48.00	40.00	48.00
*317	50.00	54.00	58.00	50.00	58.00
†321	29.00	34.00	41.00	29.25	38.00
‡347	33.00	38.00	45.00	33.00	42.00
431	19.00	22.00	29.00	17.50	22.50

STRAIGHT CHROMIUM STEEL

403	21.50	24.50	29.50	21.25	27.00
**410	18.50	21.50	26.50	17.00	22.00
416	19.00	22.00	27.00	18.25	23.50
††420	24.00	28.50	33.50	23.75	36.50
430	19.00	22.00	29.00	17.50	22.50
‡‡430F	19.50	22.50	29.50	18.75	24.50
442	22.50	25.50	32.50	24.00	32.00
446	27.50	30.50	36.50	35.00	52.00
501	8.00	12.00	15.75	12.00	17.00
502	9.00	13.00	16.75	13.00	18.00

STAINLESS CLAD STEEL (20%)

304	$$18.00	19.00	.....	.....

*With 2-3% moly. †With titanium. ‡With columbium. **Plus machining agent. ††High carbon. ‡‡Free machining. $$Includes annealing and pickling.

Basing Point Prices are (1) those announced by U. S. Steel Corp. subsidiaries for first quarter of 1941 or in effect April 16, 1941 at designated basing points or (2) those prices announced or customarily quoted by other producers at the same designated points. Base prices under (2) cannot exceed those under (1) except to the extent prevailing in third quarter of 1940.

Extras mean additions or deductions from base prices in effect April 16, 1941.

Delivered prices applying to Detroit, Eastern Michigan, Gulf and Pacific Coast points are deemed basing points except in the case of the latter two areas when water transportation is not available, in which case nearest basing point price plus all-rail freight may be charged.

Domestic Ceiling prices are the aggregate of (1) governing basing point price, (2) extras and (3) transportation charges to the point of delivery as customarily computed. **Governing basing point** is basing point nearest the consumer providing the lowest delivered price. **Emergency basing point** is the basing point at or near the place of production or origin of shipment.

Dislocated tonnage: Producers shipping material outside their usual marketing areas because of the war emergency may charge the basing point price nearest place of production plus actual cost of transportation to destination.

Seconds or off-grade iron or steel products cannot be sold at delivered prices exceeding those applying to material of prime quality.

Export ceiling prices may be either the aggregate of (1) governing basing point or emergency basing point (2) export extras (3) export transportation charges provided they are the f.a.s. seaboard quotations of the U. S. Steel Export Co. on April 16, 1941. Domestic or export extras may be used in case of Lease-Lend tonnage.

Bolts, Nuts

F.o.b. Pittsburgh, Cleveland, Birmingham, Chicago. Discounts for carloads additional 5%, full containers, add 10%.

Carriage and Machine

½ x 6 and smaller	65½ off
Do., ⅝ and ⅝ x 6-in. and shorter	63½ off
Do., ¾ to 1 x 6-in. and shorter	61 off
1⅛ and larger, all lengths	59 off
All diameters, over 6-in. long	59 off
Tire bolts	50 off

Stove Bolts

In packages with nuts separate 71-10 off; with nuts attached 71 off; bulk 80 off on 15,000 of 3-inch and shorter, or 5000 over 3-in.

Step bolts	56 off
Plow bolts	65 off

Nuts

Semifinished hex.	U.S.S.	S.A.E.
½-inch and less	62	64
⅝-1-inch	59	60
1⅛-1½-inch	57	58
1⅝ and larger	56	..

Hexagon Cap Screws

Upset 1-in., smaller	60 off

Square Head Set Screws

Upset, 1-in., smaller	68 off
Headless, ¼-in., larger	55 off
No. 10, smaller	60 off

Piling

Pittsburgh, Chicago, Buffalo	2.40c

Rivets, Washers

F.o.b. Pittsburgh, Cleveland, Chicago, Birmingham

Structural	3.75c
⅞-inch and under	65-5 off
Wrought washers, Pittsburgh, Chicago Philadelphia, to jobbers and large nut, bolt manufacturers l.c.l.	$2.75-3.00 off

Metallurgical Coke

Price Per Net Ton

Beehive Ovens

Connellsville, furnace	$6.00
Connellsville, foundry	7.00- 7.50
Connellsville prem. fdry.	7.25- 7.60
New River, foundry	8.00- 8.25
Wise county, foundry	7.50
Wise county, furnace	6.50

By-Product Foundry

Kearny, N. J., ovens	12.15
Chicago, outside delivered	11.50
Chicago, delivered	12.25
Terre Haute, delivered	12.00
Milwaukee, ovens	12.25
New England, delivered	13.75
St. Louis, delivered	12.25
Birmingham, ovens	8.50
Indianapolis, delivered	12.00
Cincinnati, delivered	11.75
Cleveland, delivered	12.30
Buffalo, delivered	12.50
Detroit, delivered	12.25
Philadelphia, delivered	12.38

Coke By-Products

Spot, gal., freight allowed east of Omaha

Pure and 90% benzol	15.00c
Toluol, two degree	28.00c
Solvent naphtha	27.00c
Industrial xylol	27.00c
Per lb. f.o.b. works	
Phenol (car lots, returnable drums)	12.50c
Do. less than car lots	13.25c
Do. tank cars	11.50c
Eastern Plants, per lb.	
Naphthalene flakes, balls, bbls. to jobbers	8.00c
Per ton, bulk, f.o.b. port	
Sulphate of ammonia	$29.00

Pig Iron

Prices (in gross tons) are maximums fixed by OPA Price Schedule No. 10, effective June 10, 1941. Exceptions indicated in footnotes. Allocation regulations from WPB Order M-17, expiring Dec. 31, 1942. Base prices bold face, delivered light face.

	No. 2 Foundry	Basic	Bessemer	Malleable
Bethlehem, Pa., base	$25.00	$24.50	$26.00	$25.50
Newark, N. J., del.	26.62	26.12	27.62	27.12
Brooklyn, N. Y., del.	27.65	.....	.....	28.15
Birdsboro, Pa., del.	25.00	24.50	26.00	25.50
Birmingham, base	†20.38	†19.00	.....	.....
Baltimore, del.	25.67	24.79	.....	.....
Boston, del.	25.12	.....	.....	.....
Chicago, del.	†24.22	.....	.....	.....
Cincinnati, del.	24.06	22.60	.....	.....
Cleveland, del.	24.12	23.24	.....	.....
Newark, N. J., del	26.24	.....	.....	.....
Philadelphia, del.	25.51	24.63	.....	.....
St. Louis, del.	†24.12	23.24	.....	.....
Buffalo, base	24.00	23.00	25.00	24.50
Boston, del.	25.50	25.00	26.50	26.00
Rochester, del.	25.53	.....	26.53	26.03
Syracuse, del.	26.08	.....	27.08	26.58
Chicago, base	24.00	23.50	24.50	24.00
Milwaukee, del.	25.17	24.67	25.67	25.17
Muskegon, Mich., del.	27.38	26.88	27.88	27.38
Cleveland, base	24.00	23.50	24.50	24.00
Akron, Canton, O., del.	25.39	24.89	25.89	25.39
Detroit, base	24.00	23.50	24.50	24.00
Saginaw, Mich., del.	26.45	25.95	26.95	26.45
Duluth, base	24.50	.....	25.00	24.50
St. Paul, del.	26.76	.....	27.26	26.76
Erie, Pa., base	24.00	23.50	25.00	24.50
Everett, Mass., base	25.00	24.50	26.00	25.50
Boston	25.50	25.00	26.50	26.00
Granite City, Ill., base	24.00	23.50	24.50	24.00
St. Louis, del.	24.50	24.00	.....	24.50
Hamilton, O., base	24.00	23.50	.....	24.00
Cincinnati, del.	24.44	24.61	.....	25.11
Neville Island, Pa., base	24.00	23.50	24.50	24.00
‡Pittsburgh, del., No. & So. sides	24.69	24.19	25.19	24.69
Provo, Utah, base	22.00	.....	.....	.....
Sharpsville, Pa., base	24.00	23.50	24.50	24.00
Sparrows Point, Md., base	25.00	24.50	.....	.....
Baltimore, del.	26.05	.....	.....	.....
Steelton, Pa., base	.....	24.50	.....	25.50
Swedeland, Pa., base	25.00	24.50	26.00	25.50
Philadelphia, del.	25.89	25.39	.....	26.39
Toledo, O., base	24.00	23.50	24.50	24.00
Mansfield, O., del.	25.94	25.44	25.44	25.94
Youngstown, O., base	24.00	23.50	24.50	24.00

*Basic silicon grade (1.75-2.25%), add 50c for each 0.25%. †For phosphorous 0.70 and over deduct 38c. ‡Over 0.70 phos. §For McKees Rocks, Pa., add .55 to Neville Island base; Lawrenceville, Homestead, McKeesport, Ambridge, Monaca, Aliquippa, .84; Monessen, Monongahela City .97 (water); Oakmont, Verona 1.11; Brackenridge 1.24.

High Silicon, Silvery

6.00-6.50 per cent (base)	$29.50		
6.51-7.00	$30.50	9.01- 9.50	$35.50
7.01-7.50	31.50	9.51-10.00	36.50
7.51-8.00	32.50	10.01-10.50	37.50
8.01-8.50	33.50	10.51-11.00	38.50
8.51-9.00	34.50	11.01-11.50	39.50

F.o.b. Jackson county, O., per gross ton, Buffalo base prices are $1.25 higher. Prices subject to additional charge of 50 cents a ton for each 0.50% manganese in excess of 1.00%.

Bessemer Ferrosilicon

Prices same as for high silicon silvery iron, plus $1 per gross ton. (For higher silicon irons a differential over and above the price of base grades is charged as well as for the hard chilling irons, Nos. 5 and 6.)

Charcoal Pig Iron

Northern

Lake Superior Furn.	$28.00
Chicago, del.	31.34

Southern

Semi-cold blast, high phos, f.o.b. furnace, Lyles, Tenn.	$28.50
Semi-cold blast, low phos., f.o.b furnace, Lyles, Tenn.	33.00

Gray Forge

Neville Island, Pa.	$23.50
Valley, base	23.50

Low Phosphorus

Basing points: Birdsboro and Steelton, Pa., and Buffalo, N. Y., $29.50 base; $30.81, delivered, Philadelphia.

Switching Charges: Basing point prices are subject to an additional charge for delivery within the switching limits of the respective districts.

Silicon Differentials: Basing point prices are subject to an additional charge not to exceed 50 cents a ton for each 0.25 silicon in excess of base grade (1.75 to 2.25%).

Phosphorous Differential: Basing point prices are subject to a reduction of 38 cents a ton for phosphorous content of 0.70% and over.

Manganese Differentials: Basing point prices subject to an additional charge not to exceed 50 cents a ton for each 0.50% manganese content in excess of 1.0%.

Ceiling prices are the aggregate of (1) governing basing point (2) differentials (3) transportation charges from governing basing point to point of delivery as customarily computed. Governing basing point is the one resulting in the lowest delivered price for the consumer.

Exceptions to Ceiling Prices: Pittsburgh Coke & Iron Co. (Sharpsville, Pa. furnace only) and Struthers Iron & Steel Co. may charge 50 cents a ton in excess of basing point prices for No. 2 Foundry, Basic, Bessemer and Malleable.

Export Prices: In case of exports only, the governing basing point nearest point of production may be used, plus differentials and export transportation charges.

Refractories

Per 1000 f.o.b. Works, Net Prices

Fire Clay Brick

Super Quality

Pa., Mo., Ky.	$64.60

First Quality

Pa., Ill., Md., Mo., Ky.	51.30
Alabama, Georgia	51.30
New Jersey	56.00

Second Quality

Pa., Ill., Ky., Md., Mo.	46.55
Georgia, Alabama	38.00
New Jersey	49.00

Ohio

First quality	43.00
Intermediate	36.10
Second quality	36.00

Malleable Bung Brick

All bases	$59.85

Silica Brick

Pennsylvania	$51.30
Joliet, E. Chicago	58.90
Birmingham, Ala.	51.30

Ladle Brick

(Pa., O., W. Va., Mo.)

Dry press	$31.00
Wire cut	29.00

Magnesite

Domestic dead-burned grains, net ton f.o.b. Chewelah, Wash., net ton, bulk	22.00
net ton, bags	26.00

Basic Brick

Net ton, f.o.b. Baltimore, Plymouth Meeting, Chester, Pa.

Chrome brick	$54.00
Chem. bonded chrome	54.00
Magnesite brick	76.00
Chem. bonded magnesite	65.00

Fluorspar

Washed gravel, duty pd., tide, net ton	nominal
Washed gravel, f.o.b. Ill., Ky., net ton, carloads, all rail	$25.00
Do., barge	25.00
No. 2 lump	25.00

Ferroalloy Prices

Ferromanganese, 78-82%,
Carlots, duty pd., seab'd $120.00
Carlots, del. Pittsburgh 125.33
Carlots, f.o.b. So. f'ces. 140.00
Add $10 for ton, $13.50 for less ton, $18 for less than 200-lb. lots.

Spiegeleisen, 19-21%, gross ton, Palmerton $36.00

Manganese Briquets, Contract carloads, bulk freight allowed, per lb. 5.50c
Packed 5.75c
Ton lots 6.00c
Less-ton lots 6.25c
Less 200-lb. lots 6.50c
Spot ¼c higher.

Manganese Electro, 99.9+%, less car lots 42.00c

Chromium Metal, per lb. contained chromium

	Contract	Spot
98% Cr. ton lots	80.00c	85.00c
88% Cr. ton lots	79.00c	84.00c

Ferrocolumbium, 50-60% f.o.b. Niagara Falls, per lb. contained Cb on contract $2.25
Less-ton lots 2.30
(Spot 10c higher)

Chromium Briquets, per lb., freight allowed

	Contract	Spot
Carlots	8.25c	8.50c
Packed	8.50c	8.75c
Ton lots	8.75c	9.00c
Less-ton lots	9.00c	9.25c
Less 200 lbs.	9.25c	9.50c

Ferrochrome, 66-70%, freight allowed, 4-6% carbon, per pound contained (chrome)
Carloads 13.00c
Ton lots 13.75c
Less-ton lots 14.00c
Less than 200-lb. lots 14.25c

67-72%, low carbon, cts. per pound:

	Car loads	Ton lots	Less ton	Less 200 lbs.
2% C.	19.50	20.25	20.75	21.00
1% C.	20.50	21.25	21.75	22.00
0.20% C.	21.50	22.25	22.75	23.00
0.10% C.	22.50	23.25	23.75	24.00

Spot is ¼c higher.

Ferromolybdenum, 55-75%, per lb. contained molybdenum, f.o.b. furnace 95.00c

Calcium Molybdate (Molyte), 40-45% Mo., per lb. contracts, f.o.b. producers plant 80.00c

Molybdic Oxide Briquets, 48-52% Mo. per lb. contained, f.o.b. producers plant 30.00c

Molybdenum Oxide, (In 5 and 20 lb. mo. contained cans) 53-63 mo. per lb. contained f.o.b. producers' plants 80.00c

Molybdenum Powder, 99%, f.o.b. York, Pa., per lb. in 200-lb. kegs $2.60
Do., 100-200 lb. lots 2.75
Do., under 100-lb. lots 3.00

Ferrophosphorus, .17-19%, gross ton carloads, f.o.b. sellers' works, $3 unitage, freight equalized with Rockdale, Tenn. for 18% phos.
Contract $58.50
Spot 62.25
23-26%, $3 unitage, freight equalized with Mt. Pleasant, Tenn., for 24% phos.
Contract 75.00
Spot 80.00

Ferrosilicon, Gross tons, freight allowed, bulk

	Carloads	Ton lots
50%	$ 74.50	$87.00
Unitage	1.50	1.75
75%	135.00	151.00
Unitage	1.80	2.00
85%	170.00	188.00
Unitage	2.00	2.20
90-95%	10.25c	11.25c

(Above for contracts; spot ¼c higher)

Silicon Metal, Spot ¼-cent higher (Per Lb., Contracts):

	1% Iron	2% Iron
Carlots	14.50c	13.00c
Ton lots	15.00c	13.50c
Less-ton lots	15.25c	13.75c
Less 200 lbs.	15.50c	14.00c

Silicon Briquets, Contract carloads, bulk freight allowed, per ton $74.50
Packed 80.50
Ton lots 84.50
Less-ton lots, per lb. 4.00c
Less 200-lb. lots 4.25c
Spot ¼c higher on less ton lots; $5 higher on ton lots and over.

Silicomanganese,

	1½%	2½%
Carbon		
Carloads (contract)	$128.00	$118.00
Ton Lots (contract)	140.50	130.50

Freight allowed spot $5 above contract

Ferrotungsten, (All prices nominal) Carlots, per lb. contained tungsten $1.90

Tungsten Metal Powder, (Prices Nominal) 98-99 per cent, per pound, depending upon quantity $2.60-$2.65

Ferrotitanium, 40-45%, f.o.b. Niagara Falls, per lb. contained in ton lots $1.23
Less ton lots 1.25
20-25%, C. 0.10 max., in ton lots per lb. contained Ti 1.35
Less-ton lots 1.40
(Spot 5c higher)

Ferro-Carbon-Titanium, 15-20% Titanium,

	6-8% C	3-5% C
Carlots, contract, f.o.b. Niagara Falls, freight allowed to destinations east of Mississippi and north of Baltimore and St. Louis	$142.50	$157.50

Ferrovanadium, 35-40%, contract per pound contained vanadium $2.70-$2.80-$2.90
(Spot 10c higher)

Vanadium Pentoxide, Per lb. contained, contracts $1.10
Do., spot 1.15

Zirconium Alloy, 12-15%, carloads, contract, bulk $102.50
Packed 107.50
Ton lots 108.00
Less ton lots 112.50
Spot $5 a ton higher
35-40%, contract, carloads, bulk or package, per lb. alloy 14.00c
Do., ton lots 15.00c
Do., less-ton lots 16.00c
Spot is ¼-cent higher

Alsifer, Per lb., f.o.b. Niagara Falls.

	Contract	Spot
Carlots	7.50c	8.00c
Ton lots	8.00c	8.50c

Simanal, Per lb. of alloy, contracts, freight allowed (approx. 20% Si, 20% Mn, 20% Al)

Carlots	Ton Lots	Less Ton Lots
10.50c	11.00c	11.50c

WAREHOUSE STEEL PRICES

Base Prices in Cents Per Pound, Delivered Locally, Subject to Prevailing Differentials. As of April 16, 1941

As Kansas City, Mo., Chattanooga, Tenn., Tulsa, Okla., and Portland, Oreg., were not named in the order fixing ceiling prices they have been omitted below.

	Soft Bars	Hot-rolled Strip Bands	Hot-rolled Strip Hoops	Plates ¼-in. & Over	Structural Shapes	Floor Plates	Sheets Hot Rolled	Sheets Cold Rolled	Sheets Galv. No. 24	Cold Rolled Strip	Cold Drawn Bars Carbon	Cold Drawn Bars S.A.E. 2300	Cold Drawn Bars S.A.E. 3100
Boston	3.98	4.06	5.06	3.85	3.85	5.66	3.71	4.68	5.11	3.46	4.13	8.88	7.23
New York (Met.)	3.84	3.96	3.96	3.76	3.75	5.56	3.58	4.60	5.00	3.51	4.09	8.84	7.19
Philadelphia	3.85	3.95	4.45	3.55	3.55	5.25	3.55	4.05	4.65	3.31	4.06	8.56	7.16
Baltimore	3.85	4.00	4.35	3.70	3.70	5.25	3.50	....	5.05	....	4.04	....	....
Norfolk, Va.	4.00	4.10	....	4.05	4.05	5.45	3.85	....	5.40	....	4.15	....	....
Buffalo	3.35	3.82	3.82	3.62	3.40	5.25	3.25	4.30	4.75	3.52	3.75	8.40	6.75
Pittsburgh	3.35	3.60	3.60	3.40	3.40	5.00	3.35	....	4.65	....	3.65	8.40	6.75
Cleveland	3.25	3.50	3.50	3.40	3.58	5.18	3.35	4.05	4.62	3.20	3.75	8.40	6.75
Detroit	3.42	3.43	3.68	3.60	3.65	5.27	3.43	4.30	4.84	3.40	3.80	8.70	7.05
Omaha	4.10	4.20	4.20	4.15	4.15	5.75	3.85	5.32	5.50	....	4.42	....	....
Cincinnati	3.60	3.67	3.67	3.65	3.68	5.28	3.42	4.37	4.92	3.45	4.00	8.75	7.10
Chicago	3.50	3.60	3.60	3.55	3.55	5.15	3.25	4.10	4.85	3.50	3.75	8.40	6.75
Twin Cities	3.75	3.85	3.85	3.80	3.80	5.40	3.50	4.35	5.00	3.83	4.34	9.09	7.44
Milwaukee	3.63	3.53	3.53	3.68	3.68	5.28	3.38	4.23	4.98	3.54	3.88	8.38	6.98
St. Louis	3.64	3.74	3.74	3.69	3.69	5.29	3.39	4.24	4.99	3.61	4.02	8.77	7.12
Indianapolis	3.60	3.75	3.75	3.70	3.70	5.30	3.45	....	5.01	....	3.97	....	....
Memphis	3.90	4.10	4.10	3.95	3.95	5.71	3.85	....	5.25	....	4.31	....	....
Birmingham	3.50	3.70	3.70	3.55	3.55	5.93	3.45	....	4.75	....	4.43	....	....
New Orleans	4.00	4.10	4.10	3.80	3.80	5.75	3.85	....	5.25	5.00	4.60	....	....
Houston, Tex.	3.75	4.30	4.30	4.05	4.05	5.50	4.00	....	5.25	....	6.90	....	....
Seattle	4.35	4.35	.	4.35	4.35	6.10	4.35	6.35	5.60	....	5.75	....	..
Los Angeles	4.50	4.95	6.80	4.50	4.50	6.75	4.65	6.50	5.85	....	6.10	10.55	9.55
San Francisco	4.10	4.60	6.35	4.25	4.25	5.95	4.25	6.40	6.00	....	6.80	10.80	9.80

	S.A.E. Hot-rolled Bars (Unannealed) 1035-1050	2300 Series	3100 Series	4100 Series	6100 Series
Boston	4.28	7.75	6.05	5.80	7.90
New York (Met.)	4.04	7.60	5.90	5.65	....
Philadelphia	4.10	7.56	5.86	5.61	8.56
Baltimore	4.45	....	....	....	....
Norfolk, Va.	....	....	....	....	....
Buffalo	3.55	7.35	5.65	5.40	7.50
Pittsburgh	3.40	7.45	5.75	5.50	7.60
Cleveland	3.30	7.55	5.85	5.85	7.70
Detroit	3.48	7.67	5.97	5.72	7.19
Cincinnati	3.65	7.69	5.99	5.74	7.84
Chicago	3.70	7.35	5.65	5.40	7.50
Twin Cities	3.95	7.70	6.00	6.09	8.19
Milwaukee	3.83	7.33	5.88	5.63	7.73
St. Louis	3.84	7.72	6.02	5.77	7.87
Seattle	6.25	....	8.00	7.85	8.65
Los Angeles	4.80	9.55	8.55	8.40	8.80
San Francisco	5.60	9.80	8.80	8.65	9.05

BASE QUANTITIES

Soft Bars, Bands, Hoops, Plates, Shapes, Floor Plates, Hot Rolled Sheets and SAE 1035-1050 Bars: Base, 400-1999 pounds; 300-1999 pounds in Los Angeles; 400-39,999 (hoops, 0-299) in San Francisco; 300-4999 pounds in Portland; 300-9999 Seattle; 400-14,999 pounds in Twin Cities; 400-3999 pounds in Birmingham, Memphis.

Cold Rolled Sheets: Base, 400-1499 pounds in Chicago, Cincinnati, Cleveland, Detroit, New York, Omaha, Kansas City, St. Louis; 450-3749 in Boston; 500-1499 in Buffalo; 1000-1999 in Philadelphia, Baltimore; 750-4999 in San Francisco; 300-4999 in Portland, Seattle; any quantity in Twin Cities, New Orleans; 300-1999 Los Angeles.

Galvanized Sheets: Base, 150-1499 pounds, New York; 150-1499 in Cleveland, Pittsburgh, Baltimore, Norfolk; 150-1049 in Los Angeles; 300-4999 in Portland, Seattle; 450-3749 in Boston; 500-1499 in Birmingham, Buffalo, Chicago, Cincinnati, Detroit, Indianapolis, Milwaukee, Omaha, St. Louis, Tulsa; 3500 and over in Chattanooga; any quantity in Twin Cities; 750-1500 in Kansas City; 150 and over in Memphis; 25 to 49 bundles in Philadelphia; 750-4999 in San Francisco.

Cold Rolled Strip: No base quantity; extras apply on lots of all size.

Cold Finished Bars: Base, 1500 pounds and over on carbon, except 0-299 in San Francisco, 500-999, Los Angeles, 1000 and over in Portland, Seattle; 1000 pounds and over on alloy, except 0-4999 in San Francisco.

SAE Hot Rolled Alloy Bars: Base, 1000 pounds and over, except 0-4999, San Francisco; 0-1999, Portland, Seattle.

EUROPEAN IRON, STEEL PRICES

Dollars at $4.02½ per Pound Sterling

Export Prices f.o.b. Port of Dispatch—

By Cable or Radio

	BRITISH Gross Tons f.o.b. U.K. Ports	£ s d
Merchant bars, 3-inch and over	$66.50	16 10 0
Merchant bars, small, under 3-inch, re-rolled	3.60c	20 0 0
Structural shapes	2.95c	15 10 0
Ship plates	2.90c	16 2 6
Boiler plates	3.17c	17 12 6
Sheets, black, 24 gage	4.00c	22 5 0
Sheets, galvanized, corrugated, 24 gage	4.61c	25 12 6
Tin plate, base box, 20 x 14, 108 pounds	$ 6.20	1 10 9

British ferromanganese $120.00 delivered Atlantic seaboard duty-paid.

Domestic Prices Delivered at Works or Furnace—

	£ s d
Foundry No. 3 Pig Iron, Silicon 2.50—3.00	$25.79 6 8 0(a)
Basic pig iron	24.28 6 0 6(a)
Furnace coke, f.o.t. ovens	7.56 1 17 6
Billets, basic soft, 100-ton lots and over	49.37 12 5 0
Standard rails, 60 lbs. per yard, 500-ton lots & over	2.61c 14 10 6
Merchant bars, rounds and squares, under 3-inch	3.17c 17 12 0††
Shapes	2.77c 15 8 0††
Ship plates	2.91c 16 3 0††
Boiler plates	3.06c 17 0 6††
Sheets, black, 24 gage, 4-ton lots and over	4.10c 22 15 0
Sheets, galvanized 24 gage, corrugated, 4-ton lots & over	4.70c 26 2 6
Plain wire, mild drawn, catch weight coils, 2-ton lots and over	4.28c 23 15 0
Bands and strips, hot-rolled	3.30c 18 7 0

(a) del. Middlesbrough 5s rebate to approved customers. ††Rebate 15s on certain conditions.

Ores

Lake Superior Iron Ore

Gross ton, 51½% Lower Lake Ports

Old range bessemer	$4.75
Mesabi nonbessemer	4.45
High phosphorus	4.35
Mesabi bessemer	4.60
Old range nonbessemer	4.60

Eastern Local Ore

Cents, unit, del. E. Pa.

Foundry and basic 56-63%, contract	12.00

Foreign Ore

Cents per unit, c.i.f. Atlantic ports

Manganiferous ore, 45-55% Fe., 6-10% Mang.	Nom.
N. African low phos.	Nom.
Spanish, No. African basic, 50 to 60%	Nom.
Chinese wolframite, net ton, duty pd.	$24.00
Brazil iron ore, 68-69% ord.	7.50c
Low phos. (.02 max.) F.O.B. Rio Janeiro	8.00c
Scheelite, imp.	23.50-24.00

Chrome Ore

Gross ton c.i.f. Baltimore; dry basis; subject to penalties for guarantees

Indian and African, 2.8:1 lump, 48%	$39.00
South African (excluding war risk) No ratio lump, 44%	28.00
Do. 45%	29.00
Do. 48%	34.00
Do. concentrates, 48%	33.00
Do. 50%	34.00
Brazilian	
2.5:1 lump, 44%	31.00
2.8:1 lump, 44%	32.50
3:1 lump, 48%	41.00
No ratio lump, 48%	35.00-35.50
Do. concentrate, 48%	33.00-33.50
Philippine	
No ratio lump, 45%	32.00
2.8:1 lump, 48%	40.00
Do., concentrate, 48%	39.00
2.5:1 concentrate, 48%	36.50
No ratio concentrate, 48%	34.00
No ratio lump, 48%	35.00
Rhodesian	nominal

Manganese Ore

Including war risk but not duty, cents per unit cargo lots

Caucasian, 50-52%	
S. African, 48%	65.00
Indian, 50%	66.00
Brazilian, 48%	65.00
Chilean, 48%	68.00
Cuban, 51%, duty free	81.00-83.00

Molybdenum

Sulphide conc., lb., Mo. cont., mines	$0.75

MAXIMUM PRICES FIXED BY OPA ON IRON AND STEEL SCRAP

Other than railroad grades quoted on the basis of basing point prices from which shipping point prices and consumers' delivered prices are to be computed. Scrap originating from railroads quoted delivered to consumers' plants located on the line of the railroad from which the material originated. All prices in gross tons. A basing point includes its switching district.

PRICES FOR OTHER THAN RAILROAD SCRAP

				ELECTRIC FURNACE AND FOUNDRY GRADES										
				Low Phos. Grades		Heavy Structural, Plate			Cut Auto Scrap					
	OPEN HEARTH GRADES*	Machine Shop Turnings	BLAST FURNACE GRADES*	Billet, Bloom Forge Crops	Bar Crops and smaller; Punchings, Plate	3 ft. and less	2 ft. and less	1 ft. and less	3 ft. and less	2 ft. and less	1 ft. and less	Alloy-Free Low Phos. & Sulphur Turnings	First Cut Heavy Axle & Forge Turnings	Electric Furnace Bundles
Pittsburgh, Brackenridge, Butler, Johnstown, Midland, Monessen, Sharon, Steubenville, Weirton, Canton, Youngstown, Warren	$20.00	$16.00	$16.00	$25.00	$22.50	$21.00	$21.50	$22.00	$20.00	$20.50	$21.00	$18.00	$19.50	$21.00
Claymont, Coatesville, Harrisburg, Conshohocken, Phoenixville	18.75	14.75	14.75	23.75	21.25	19.75	20.25	20.75	18.75	19.25	19.75	16.75	18.25	19.75
Bethlehem	18.25	14.25	14.25	23.25	20.75	19.25	19.75	20.25	18.25	18.75	19.25	16.25	17.75	19.25
Buffalo	19.25	15.25	15.25	24.25	21.75	20.25	20.75	21.25	19.25	19.75	20.25	17.25	18.75	20.25
Cleveland, Middletown, Cincinnati, Portsmouth, Ashland	19.50	15.50	15.50	24.50	22.00	20.50	21.00	21.50	19.50	20.00	20.50	17.50	19.00	20.50
Detroit	17.85	13.85	13.85	22.85	20.35	18.85	19.35	19.85	17.85	18.35	18.85	15.85	17.35	18.85
Toledo	.....	13.85	13.85	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....	.....
Chicago	18.75	14.75	14.75	23.75	21.25	19.75	20.25	20.75	18.75	19.25	19.75	16.75	18.25	19.75
Kokomo	18.25	14.25	14.25	23.25	20.75	19.25	19.75	20.25	18.25	18.75	19.25	16.25	17.75	19.25
Duluth	18.00	14.00	14.00	23.00	20.50	19.00	19.50	20.00	18.00	18.50	19.00	16.00	17.50	19.00
St. Louis	17.50	13.50	13.50	22.50	20.00	18.50	19.00	19.50	17.50	18.00	18.50	15.50	17.00	18.50
Birmingham, Atlanta, Alabama City, Los Angeles, San Francisco, Pittsburg, Calif.	17.00	13.00	13.00	22.00	19.50	18.00	18.50	19.00	17.00	17.50	18.00	15.00	16.50	18.00
Minnequa, Colo.	16.50	12.50	12.50	21.50	19.00	17.50	18.00	18.50	16.50	17.00	17.50	14.50	16.00	17.50
Seattle	14.50	10.50	10.50	19.50	17.00	15.50	16.00	16.50	14.50	15.00	15.50	12.50	14.00	15.50
Portland, Oreg.	.....	.....	.....	.....	15.50	14.00	14.50	15.00	13.00	13.50	14.00	11.00	12.50	14.00

RAILROAD SCRAP

	Heavy Melting Steel	Scrap Rails	Rails for Rolling	Scrap Rails: 3 ft. and under	Scrap Rails: 2 ft. and under	Scrap Rails: 18 in. and under
Pittsburgh, Wheeling, Steubenville, Sharon, Youngstown, Canton	21.00	22.00	23.50	24.00	24.25	24.50
Philadelphia, Wilmington, Sparrows Point	19.75	20.75	22.25	22.75	23.00	23.25
Cleveland, Cincinnati, Middletown, Ashland, Portsmouth	20.50	21.50	23.00	23.50	23.75	24.00
Chicago	19.75	20.75	22.25	22.75	23.00	23.25
Buffalo	20.25	21.25	22.75	23.25	23.50	23.75
Detroit	18.85	19.85	21.35	21.85	22.10	22.35
Kokomo	19.25	20.25	21.75	22.25	22.50	22.75
Duluth	19.00	20.00	21.50	22.00	22.25	22.50
Kansas City, Mo.	17.00	18.00	19.50	20.00	20.25	20.50
St. Louis	18.50	19.50	21.00	21.50	21.75	22.00
Birmingham	18.00	19.00	20.50	21.00	21.25	21.50
Los Angeles, San Francisco	18.00	19.00	20.50	21.00	21.25	21.50
Seattle	15.50	16.50	18.00	18.50	18.75	19.00

CAST IRON SCRAP OTHER THAN RAILROAD

(Shipping point prices in gross tons)

	Group A	Group B	Group C
No. 1 Cupola Cast	$18.00	$19.00	$20.00
No. 1 Machinery Cast, Drop Broken, 150 lbs. & Under	18.00	19.00	20.00
Clean Auto Cast	18.00	19.00	20.00
Stove Plate	17.00	18.00	19.00
Unstripped Motor Blocks	17.50	18.50	19.50
Heavy Breakable Cast	15.50	16.50	17.50
Charging Box Size Cast	17.00	18.00	19.00
Miscellaneous Malleable	20.00	21.00	22.00

Group A includes the states of Montana, Idaho, Wyoming, Nevada, Utah, Arizona and New Mexico.

Group B includes the states of North Dakota, South Dakota, Nebraska, Colorado, Kansas, Oklahoma, Texas and Florida.

Group C includes states not named in groups A and B, plus Kansas City, Kans.-Mo.

***Open Hearth Grades** refer to No. 1 heavy melting steel, No. 1 hydraulic compressed black sheet scrap, No. 2 heavy melting steel, dealers' No. 1 bundles, dealers' No. 2 bundles and No. 1 busheling. **Blast Furnace Grades** refer to mixed borings and turnings, shoveling turnings, No. 2 busheling and cast iron borings. Add $3 for chemical borings, $5 when chemical borings used in manufacture of explosives.

A basing point includes the switching district of the city named. The Pittsburgh basing point includes the switching districts of Bessemer, Homestead, Duquesne, Munhall and McKeesport, Pa. Cincinnati basing point includes the switching district of Newport, Ky. St. Louis basing point includes the switching districts of Granite City, East St. Louis and Madison, Ill. San Francisco basing point includes the switching districts of South San Francisco, Niles and Oakland, Calif.

Inferior Grades: Maximum prices of inferior grades shall continue to bear the same differential below the corresponding listed grades as existed from Sept. 1, 1940, to Jan. 31, 1941. No premium allowed on grades considered superior, unless approved by OPA. Addition of special preparation charges prohibited. Purchase of electric furnace or foundry grades for open hearth or blast furnace use permitted only at no more than price for corresponding open hearth grade. Exceptions: Low phos. billet, bloom and forge crops and electric furnace bundles may exceed open hearth price, and electric furnace bundles may exceed blast furnace price, if material is delivered to the consumer direct from the original industrial producer.

Commissions: No commission is payable except by a consumer to a broker for services rendered, the commission not to exceed 50 cents per gross ton. No commission is payable unless: The broker guarantees the quality and delivery of an agreed tonnage the scrap is purchased at a price no higher than the maximum allowed; the broker sells the scrap to the consumer at the same price at which he purchased it; the broker does not split the commission with the seller of the scrap, with another broker or sub-broker, or with the consumer. No commission is payable for preparation of scrap.

Maximum Shipping Point Price: Where shipment to consumer is by rail, vessel or combination of both, scrap is at its shipping point when it has been placed f.o.b. railroad car or f.a.s. vessel. In such cases, maximum shipping point prices are: (1) For shipping points located within a basing point, the price listed in the above table for scrap at the basing point in which the shipping point is located, minus the lowest established switching charge for scrap within the basing point; and (2) for shipping points located outside a basing point, the price in the above table for scrap at the most favorable basing point, minus the lowest transportation charge by rail, water or combination thereof. When vessel movement is involved, dock charges shall be 50 cents at Memphis, $1 at Great Lakes ports, $1.25 at New England ports, 75 cents elsewhere. New England shipping point prices computed on most favorable basing point prices; maximum transportation charge on scrap from New England, $6.27 per ton.

Scrap shipped by motor vehicle is at its shipping point when loaded. For shipping points within basing points, maximum is price listed in table minus lowest switching charge. When outside basing point, maximum is price at most favorable basing point minus lowest established charge when hauled by common carrier. When hauled by seller charges are based on carload rate for rail shipment, minimum $1.00 per ton.

Maximum Delivered Prices: Determined by adding established transportation charges to shipping point price, not to exceed by more than $1 the prices listed in the table for the nearest basing point. Certain exceptions specified in OPA Price Schedule No. 4 (Amendment 11) apply to St. Louis district consumers, to WPB allocations, to water shipments from Duluth or Superior, Wis., to shipments of billets, blooms and forge crops from Pittsburgh and to shipments of electric and foundry grades from Michigan.

Unprepared Scrap: Above prices are for prepared scrap. Maximum prices for unprepared scrap are $2.50 less than for the corresponding grades of prepared scrap, except for heavy breakable cast. In no case shall electric furnace and foundry grades be used as the "corresponding grade or grades of prepared scrap." Graveyard autos not considered unprepared scrap.

Remote Scrap: Consists of all grades, except railroad scrap, located in Florida, Montana, Idaho, Wyoming, Nevada, Arizona, New Mexico, Texas, Oklahoma, Oregon and Utah. Delivered price may exceed by not more than $5 the price at the basing point nearest consumer's plant, provided sworn details furnished OPA. Permission required to exceed by more than $5 the nearest basing point price.

Sheets, Strip

Sheet & Strip Prices, Page 110

Sheet tonnage on mill books continues to increase, with few sellers attempting to quote deliveries under A-1-j. While bookings are not being accepted for such low priorities some mills are making delivery on A-6 to A-10 business booked long ago. This is expected to disappear soon.

Heavy concentration of new business taken by large producers is in A-1 rating. This sends A-2 and A-3 rated tonnage to smaller mills, thus crowding out any lower.

Sheet buyers have been forced to place orders with other suppliers than their usual sources as a result of priority schedules, thus creating many new customer relations.

Many directives have been issued to free orders held back by other tonnages of equally high preference, booked earlier. Most of these directives are in the form of better rating for the delayed tonnage, as A-1-a continues to assure prompt movement. Deliveries for most part are on schedule, according to rating.

One difficulty not yet solved is joint use of sheet mills for plates, sheets and tinmill products. Often choice between a plate allocation and an A-1-a sheet directive is difficult to make.

Andrews Steel Co. and Newport Rolling Mill Co., which had been down for alterations and repairs for more than a week, are resuming production on an increased scale.

Narrow hot and cold-rolled strip production is dependent on semi-finished steel supply. Little hot-rolled is available below A-3 rating and while cold rollers still are able to cover priority material below that classification from hot-rolled inventory most will be forced to narrow operations within 30 days to the supply of hot-rolled available. Cold-rolled strip producers' bookings are heavier than last month but still are below capacity, with ratings tending higher.

New business contains an unusually high proportion of high carbon and alloys, which tends to retard output by frequent changes in analysis. Alloy strip is practically allocated above A-1-j rating.

Plates

Plate Prices, Page 111

Conditions have improved in respect to plate deliveries, output of continuous strip mills easing pressure on regular plate mills. New units under construction will improve the situation further but time will be required.

It appears that shipbuilding plants will be furnished all the ship plates they need through the remainder of this year. Expansion of facilities for ship construction and plate production seem likely to run an even race. Smaller ships are using almost exclusively the product of strip mills, thus relieving universal and sheared plate mills of large tonnage. Plates for larger vessels and armor plate must await new sources as demand increases.

Iron and Steel Branch, War Production Board, has advised suppliers to make no more plate shipments, except for locomotive orders and fireboxes, to the New York Central shops at Beach Grove, Ind., and all shops of the Pennsylvania and Louisville & Nashville railroads until further notice, as inventories are regarded as excessive. It is stated the two former have inventory for seven months use and the latter for 13 months.

This may be the forerunner of further action by WPB along this line, as returns under the new Form 299 covering consumer inventory are studied in Washington. In some cases it is believed excess inventory may have been caused by inability to use stocks effectively because of shortage of other products and unbalancing of specifications of plate stocks for which the consumer may not be responsible. In a firm effort to check accumulation it may be necessary to redistribute some stocks now in consumers' hands.

Between 250,000 and 275,000 tons, mostly plates, required for ships, is now being placed with several of the smaller commercial yards against a new navy program.

PLATE CONTRACTS PLACED

375 tons, floor plates, navy various deliveries, divided, American Pressed Steel Co., Philadelphia, and Central Iron & Steel Co., Harrisburg; 650 tons, marine

SAVE PRODUCTION TIME
with a
SHOPLIFTER

One man can handle heavy dies alone. Not necessary to stop other machines to get help.

MORE production per day from your machines if a Shoplifter is handy to do the heavy job of moving dies from storage racks to the press. In these times when maximum production of machines is of vital importance, much time and labor can be saved if the operator can handle the heavy work of changing dies without calling for help from other operators.

The Shoplifter is built for this job. Dependable and safe with a rated capacity of 500 lbs. (heavier machines up to 5000 lbs. can be furnished). Entire machine built of structural steel. Electrically welded throughout. Platform lifts 57" above floor and lowers to within 8¼" of floor. Overall height 72". Size of platform 24"x24" steel plate. Crank, up and down, hoist unit.

Price
$147.50
F.O.B. Delivered

ECONOMY ENGINEERING CO.
2659 W. Van Buren St., Chicago

IMMEDIATE DELIVERY
on priority of A-10 or better.

boiler plate, various deliveries, awarded Otis Steel Co., Cleveland, and Central Iron & Steel Co., Harrisburg, Pa.

PLATE CONTRACTS PENDING

100 tons, 300 16-foot, 8-inch high carbon ⅞-inch and one-quarter inch plate steel pipe, 20-inch, shore discharge pipe, U. S. Engineer, Philadelphia; bids Mar. 30.

Bars

Bar Prices, Page 110

Under broadened demand and with heavier specifications against old orders bars approach plates in intensity of demand. Mill backlogs are expanding with A-1-a and A-1-b deliveries up to 12 weeks and little available under 14 weeks on A-1-c rating. Shipments on products of 13 and 14-inch bar mills are tight for other than shell work and allocations usually are made for this material.

Alloy and cold-finished bars are most active and wide-scale conversion to war work is stimulating demand for all finishes. Forging shops are increasing releases as operations continue at capacity and tool steels are being consumed heavily.

Pipe

Pipe Prices, Page 111

Cast iron pipe buying is limited to higher priorities, with war plant expansions and export demand taking large tonnages. Delivery is an important factor in placing tonnage and some orders on A-1 rating are delivered in three weeks. Shipping space limitations tend to slow export movement. Normal municipal demand is being held down and substitution of nonmetal pipe is being urged for some new projects. This is opening a field for competitive material which may be felt later by cost pipe foundries.

Southern pipe foundries are operating six days a week but not at full capacity, due to scarcity of pig iron. Pipe plants are being converted to strictly war production in that district.

CAST PIPE PLACED

100 tons, housing project at Poulsbo, Wash., to Pacific States Cast Iron Pipe Co., Provo, Utah.

STEEL PIPE PLACED

2100 tons, mainly 48-inch, midwestern ordnance works, to Bethlehem Steel Co., through Du Pont interests.

STEEL PIPE PENDING

127 tons, copper-nickel alloy condenser tubes, navy, Norfolk, Va. and Mare Island, Calif., bids in.

TIMES HAVE CHANGED. 'Control of the Air' is as essential in a war time economy as it is in the militaristic sense. It can no longer be ignored in any plant, regardless of size.

Dust spells inefficiency and waste—and these conditions cannot be condoned today when every shackle that keeps production in check *must* be loosed.

When the time comes "to do something" about the dust condition in your plant be sure to investigate "Dustubes"—they have the high efficiency necessary to do your job better; and they are by far the simplest cloth type collector to install, operate, and maintain. Write for literature today.

AMERICAN
FOUNDRY EQUIPMENT CO.
502 S. BYRKIT ST. MISHAWAKA, IND.

Wire

Wire Prices, Page 111

Ratio of high-rated orders for finished wire products on books of mills producing their own wire rods is seriously threatening supplies of semifinished steel for nonintegrated mills, although the latter also have heavy orders for top priority requirements. Normal supply for the latter is not available either in carbon or alloy rods.

Aggregate volume being offered mills is heavy, but some is not being accepted, new bookings constantly increasing the proportion of higher ratings. While semifinished steel presents a problem, heat treating is another matter of concern in specialty departments, such equipment being generally operated seven days per week. Most wiremakers have materially increased heat treating equipment capacity, though some of this will not be in full operation for several weeks.

Heavy lend-lease demand is also curtailing wire rod supplies for domestic finishing. Nails by the thousands of kegs have been bought by the government on A-1-a rating and jobber shipments are much reduced. Barbed wire exports are cutting into domestic supply.

Rails, Cars

Track Material Prices, Page 111

Freigh car production, already behind schedule, may be reduced further. Some car shops recently have been allocated shapes and bars to adjust unbalanced steel supply but this will not enable full production. Commercial car shops in the first two months this year completed 13,974 cars, not quite half their capacity of 14,000 per month. Railroad shops in the two months produced about 3500 cars,

which figure probably includes some rebuilt units.

For a number of months plates were in short supply but recently plates from continuous strip mills have been supplied in better volume but shapes, bars and sheets now are being received in much smaller tonnage than needed. While supplyof wheels and axles is increasingly tight this has not interfered materially.

Orders placed so far this year are slightly behind output of commercial and railroad shops. Some inquiries are understood to be held back by inability to obtain definite promise of delivery. With better conditions in shops a large volume probably would be placed within a short time.

LOCOMOTIVES PLACED

Delaware & Hudson, fifteen 4-8-4 steam locomotives, to American Locomotive Co., New York.

Denver & Rio Grande Western, six 5400-horsepower diesel-electric freight locomotives, to Electro Motive Corp., LaGrange, Ill.

Navy, four 1000-horsepower 115-ton diesel electric locomotives, deliveries to Hingham, Mass., White Plains, Md., Burns City, Ind., and Thorne, Nev., to Electro Motive Corp., LaGrange, Ill.

Richmond, Fredericksburg & Potomac, ten 2-8-4 steam locomotives, to Lima Locomotive Works, Lima, O.

Southern Pacific, 70 locomotives, including 40 steam engines, 30 to Baldwin Locomotive Works, Eddystone, Pa., 10 to Lima Locomotive Works, Lima, O., and 30 diesel-electric switch engines, to American Locomotive Co., New York.

LOCOMOTIVES PENDING

War Department, Quartermaster Corps, nine to twelve 0-6-0 type switch engines, reported contemplated.

CAR ORDERS PLACED

National Railroads of Mexico, 200 tank cars, to American Car & Foundry Co., New York.

Union Pacific, 1000 fifty-ton gondolas to Pullman-Standard Car Mfg. Co., Chicago.

CAR ORDERS PENDING

Baldwin Locomotive Works, fifteen 50-ton drop-end gondolas; bids asked.

Bessemer & Lake Erie, 800 90-ton hoppers.

Duluth, Missabe & Iron Range, 2000 seventy-five-ton ore cars.

Navy, 28 forty-ton flats and 15 forty-ton box; bids in.

Navy, five armored deck cars, 275,000 pounds capacity, Dahlgren, Va., Haffner-Thrall Car Co., Chicago, low, also on two caboose cars; American Car & Foundry Co. low on one passenger and baggage car, and Edwards Co., New York, low on one motorailer.

Texas & Pacific, 500 fifty-ton box.

Bolts, Nuts, Rivets

Bolt, Nut, Rivet Prices, Page 111

The first important allocation in the bolt and nut industry for some time is scheduled to be made shortly and will involve approximately 15,000 tons of bolts, nuts, washers, slit rings and rods for army engineers. It is planned to have shipments start April 1 and run through to June 30, with the material to be used in the assembly of standard timber roof trusses and building frames. Bolt and nut producers are expected to advise the WPB by March 26 as to what they believe they are in a position to handle.

Structural Shapes

Structural Shape Prices, Page 111

Most mills producing structural shapes are unable to accept anything with priority under A-1-j and the secondary market has heavy demand for A-1-a tonnage. Some fabricators are seeking abandoned plants which can be bought, dismantled and the structural steel used instead of new. Some plant expansions are being held up because of inability to obtain structural material.

Railroad car shops find their supply of special carbuilding shapes much reduced because of inability to obtain delivery under the A-3 rating given them.

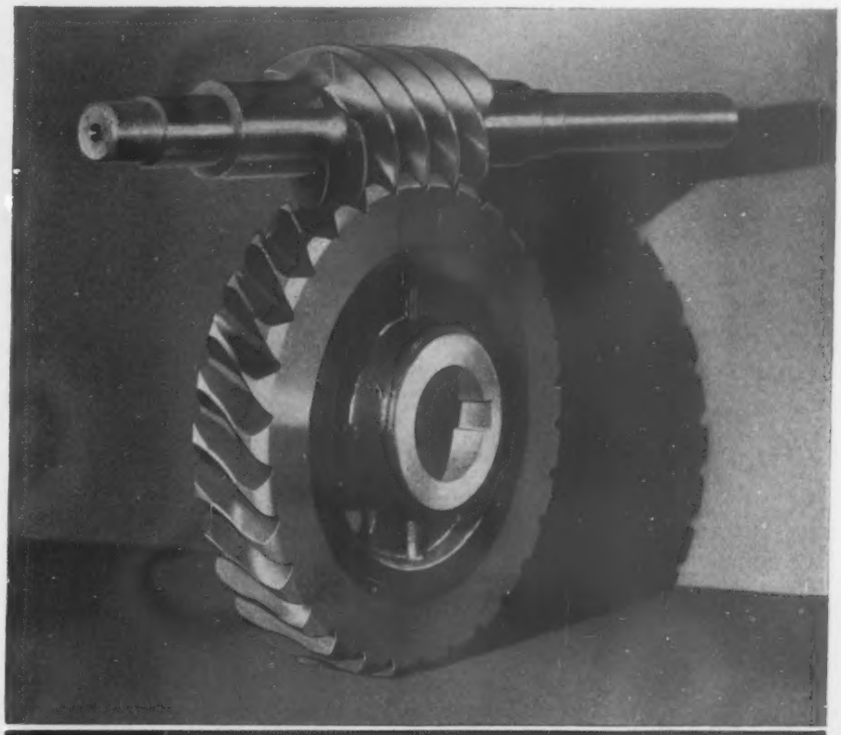
SHAPE CONTRACTS PLACED

5830 tons, extension, Granite City Steel Co., Granite City, Ill., to Stupp Bros. Bridge & Iron Co., St. Louis county, Missouri.

3500 tons, shipyards cranes on Pacific Coast; to Pacific Car & Foundry Co., Seattle.

2000 tons, expansion, propeller division, Curtiss-Wright Corp., to Harris Structural Steel Co. Inc., New York; John W. Ryan Construction Co., New York, contractor; bids March 13.

2000 tons, Commercial Solvents Corp.,



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THE HORSBURGH & SCOTT CO.

GEARS AND SPEED REDUCERS

5112 HAMILTON AVENUE • CLEVELAND, OHIO, U. S. A.

Sterlington, La., to Stacey Bros. Gas Construction Co., Cincinnati.

1700 tons, manufacturing plant, Pullman-Standard Car Mfg. Co., Chicago, to Wendnagel & Co., Chicago; Kaiser Ducett Co., Chicago, contractor.

1050 tons, hangar, General Motors Corp., Linden, N. J., to American Bridge, Co., Pittsburgh.

1000 tons, open-hearth building, Sheffield Steel Co., Houston, Tex., to Stupp Bros. Bridge & Iron Co., St. Louis county, Missouri.

600 tons, plant addition, Buffalo Machine & Foundry Co., Buffalo, to Ernst Iron Works, Buffalo.

300 tons, powerhouse addition, eastern navy yard, to Morris Wheeler & Co. Philadelphia.

280 tons, industrial plant buildings, Norwood, Mass., to Whitehead & Kales Co., Detroit, Mich.; M. Spinelli & Sons Inc., Boston, contractor; reinforcing bars to Morrison-Stevens Co., Boston.

233 tons, Peavey Falls Dam, Sagola, Mich., for Wisconsin-Michigan Power Co., to Fox River Boiler Works, Appleton, Wis.

200 tons, various western defense projects, to Standard Steel Fabricating Co., Seattle.

175 tons, river crossing towers, Bonneville Dam, to Lehigh Structural Steel Co., Allentown, Pa.

100 tons, municipal housing project, Louisville, Ky., to Sneed Architectural Iron Works, Louisville; George H. Rommel Co., Louisville, contractor.

Unstated tonnage, Army hangar, control tower and boiler house, shapes to Guibert Steel Co., Pittsburgh; bars to Dietrich Bros. Inc., Baltimore; G. Walter Tovell Inc., Baltimore, contractor.

SHAPE AWARDS COMPARED

	Tons
Week ended March 21	19,968
Week ended March 14	8,975
Week ended March 7	16,490
This week, 1941	14,339
Weekly average, 1942	21,431
Weekly average, 1941	27,373
Weekly average, Feb., 1942	26,915
Total, 1941	357,224
Total, 1942	235,738

Includes awards of 100 tons or more.

SHAPE CONTRACTS PENDING

2200 or 4500 tons, army hangars in western area; Henry Georg, Spokane, general contractor.

1240 tons, 14 bridges for Alaska Road Commission; bids to purchasing department, Seattle, March 25.

650 tons, sheet piling, power house, Meredosia, Ill., for Central Illinois Public Service Co.; Sargent & Lundy, Chicago, engineers; bids April 2.

158 tons, bridge No. 18, War department building-road network, Arlington, Va.; bids March 23, Federal Works Agency, Public Roads Administration, Washington.

Unstated, steel poles, 30 and 35 feet; bids in at Seattle.

Unstated, two bridges at Walla Walla, Wash.; no bids received by United States engineer, Portland.

Unstated, steel structures at nine power substations in Washington and Oregon; bids to Bonneville Power Administration, Portland, Oreg., March 25.

Unstated, rebuilding and new bridges, Northern Pacific main line, State of Washington; Fielding & Shipley, St. Paul, contractors; materials furnished by railroad.

Reinforcing Bars

Reinforcing Bar Prices, Page 111

Reinforcing bar backlogs have stabilized for the first time in many months and have stopped mounting. There are signs that lower rated jobs, delayed for a long time, may reach scheduling points this spring. At the same time, bar mills have heavy tonnage of rated merchant bar tonnage which would be rolled if mill time allotted to reinforcing bars should not be needed for rated tonnage. However, A-2 and A-3 tonnage have a better chance of being given delivery. March shipments will exceed new bookings. Some large war jobs are pending, placing of which may reverse this situation. Part of these are not yet on the drawing boards and will require time to mature.

Deliveries have been maintained so close to schedule that directives have not been necessary in this product. A-1-a rating assures as quick delivery as a directive order in most cases.

REINFORCING STEEL AWARDS

5000 tons or more, increases under blanket contracts for defense projects in western areas, to Bethlehem Steel Co., Seattle.

830 tons, municipal housing project,

Thomastrip Is Available In BRIGHT FINISH NOT COATED, HOT TIN COATED, ELECTRO COATED WITH NICKEL OR ZINC, COPPER, BRASS

Electro coated and bright uncoated cold rolled Thomastrip offer wide possibilities for your Victory products. Thomas has had broad experience in meeting a wide range of special requirements, and in consistently duplicating them. Hence, difficult emergency specifications now receive experienced attention. Send sketches, parts, or describe by letter your "all out" products.

THE THOMAS STEEL CO., WARREN, OHIO
SPECIALIZED PRODUCERS OF COLD ROLLED STRIP STEEL

Louisville, Ky., to American Builders Supply Co., Louisville; George H. Rommel Co., Louisville, contractor.

440 tons, building, Edward Katzinger Co., Chicago, to Joseph T. Ryerson & Son Inc., Chicago; B. W. Handler Construction Co., Chicago, contractor.

260 tons, sewage treatment plant, army cantonment, to Bethlehem Steel Co., Bethlehem, Pa.; bids March 7.

160 tons, plant, Yellow Coach & Mfg. division, General Motors Corp., Pontiac, Mich., to Great Lakes Steel Corp., Detroit, through Taylor & Gaskin, Detroit.

128 tons, health school, University of Michigan, Ann Arbor, Mich., to Great Lakes Steel Corp., Detroit, through McRae Steel Co.

120 tons, reservoir, army cantonment, to Ceco Steel Products Corp., Milwaukee; bids March 7.

120 tons, Parker Rustproof Co., Marengo, Ill., to Republic Steel Corp., Cleveland, through Truscon Steel Co., Youngstown, O., through R. E. Dailey, contractor.

104 tons, state highway project, Willow Run, Mich., to Great Lakes Steel Corp., Detroit, through Ceco Steel Products Co., Detroit; F. J. Vanderveen, contractor.

100 tons, expansion, Victor Adding Machine Co., Chicago, to Joseph T. Ryerson & Son Inc., Chicago; Henry Ericsson Co., Chicago, contractor.

REINFORCING STEEL PENDING

500 tons, plant addition, Buffalo Machine & Foundry Co., Buffalo.

225 tons, grading, DA WR-8, bridge 11, War Department building-road network, Arlington, Va.; bids March 27, Federal Works Agency, Public Roads Administration, Washington.

210 tons, bridge No. 11, Da WR-8, War Department road network, Arlington, Va.; bids March 30, Federal Works Agency, Public Roads Administration, Washington.

135 tons, paving, DA WR-8, War Department building-road network, Arlington, Va.; bids March 20, Federal Works Agency, Public Roads Administration, Washington.

105 tons, bridge No. 18, War Department building-road network, Arlington, Va.; bids March 23, Federal Works Agency, Public Roads Administration, Washington.

Pig Iron

Pig Iron Prices, Page 112

Tendency toward higher priorities on pig iron orders continues and less iron is being shipped for other than war purposes. In general, shipments under B priorities have practically disappeared. Each month requests for iron show increased participation in war work. In machine tool manufacturing centers demand is heavy and iron is being supplied in sufficient tonnage to support tool production as an essential.

Shipments to New England melters next month will be somewhat broader from outside sources, although less than might have been expected with the Everett furnace down for relining. A reserve built up in anticipation of this idle period has cushioned the situation. Foundries in that area are being asked to revise specifications where possible, to ease demand for malleable. Basic seems tighter than foundry grades.

CONCRETE BARS COMPARED

	Tons
Week ended March 21	7,262
Week ended March 14	13,307
Week ended March 7	9,054
This week, 1941	11,389
Weekly average, 1942	3,150
Weekly average, 1941	13,609
Weekly average, Feb., 1942	3,489
Total, 1941	120,378
Total, 1942	89,655

Includes awards of 100 tons or more.

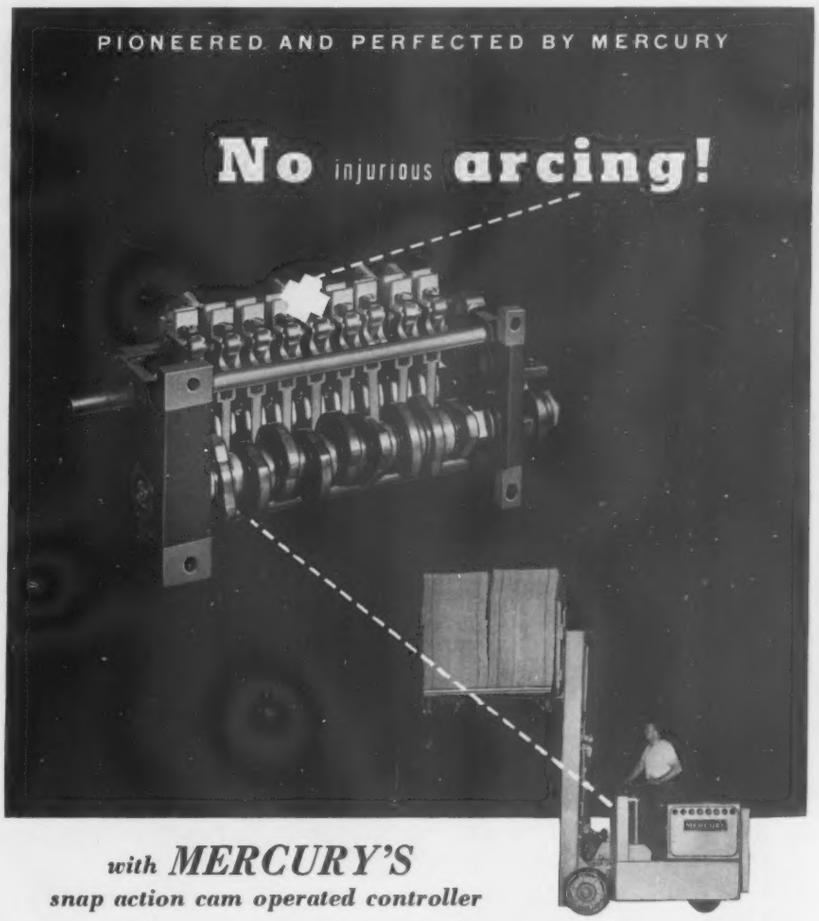
Scrap

Scrap Prices, Page 114

Reclaiming scrap from automobile wrecking yards, farms, industrial plants and homes is gaining momentum and aggregate tonnage shows an increase, although not yet sufficient to meet needs. Better weather is aiding collection and preparation. On the other hand, advancing season will tend to reduce flow from farms as seasonal work will prevent farmers from devoting time to scrap collection.

Material from these sources is nonrecurrent and once it is cleared there will be little further accumulation. This is especially true of wrecking of automobiles as the present situation will tend to keep cars operating as long as possible in absence of new supply.

On refusal of Interstate Commerce Commission to delay appli-



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Operation is mechanical and cam actuated. Makes and breaks contacts clean as a whistle. No injurious arcing — no time out for repairs. Provides 3 running speeds either forward or reverse in Mercury Lift Trucks, 4 speeds in Mercury Fork Trucks.

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The Hydraulic Lift
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Single Unit Double Reduction Drive Axle
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MERCURY TRACTORS TRAILERS LIFT TRUCKS

MANUFACTURING CO. 4140 S. Halsted St., Chicago, Ill.

cation of the 6 per cent freight rate increase on scrap OPA has issued an amendment to the price schedule which allows the added freight charge to be billed to the consumer. This is done to avoid downward adjustment of prices by shippers, which in the judgment of the administrator, would tend to impede free flow of scrap into industrial production.

In general scrap supply seems to have reached a level only sufficient to support current rate of consumption but not enough to allow idle open hearths to be returned to service. In many areas mills report they are receiving just enough to continue from week to week, without accumulating any reserve for contingencies. Some allocations are being applied to aid consumers where supply is inadequate.

Pacific Coast

Seattle—Major awards by Bonneville Power Administration for generating and other equipment featured the week. General Electric Co. has the contract at $1,891,590 to furnish transformers for Covington, Ampere and Mead substations, and a $877,415 award for supplying circuit breakers to Ampere. Allis-Chalmers Mfg. Co., Milwaukee, is low at $866,535 for furnishing synchronous condensers to the same agency.

Large contracts have been placed by United States engineers for cantonment construction in an unstated western area, the major award to a combination of Lovering Construction Co., St. Paul, Halverson Construction Co., Billings, and John Sletten, Great Falls, Mont. Another contract went to H. S. Wright, Seattle, L. H. Hoffman and W. C. Smith Inc., Portland, figures not released, while Strong & MacDonald Inc., Tacoma, and Moore & Roberts, San Francisco, were low on other units.

While engineers of the Washington Toll Bridge Authority are working on plans for an enlarged and altered design to replace the Narrows bridge wrecked in a gale in 1940, it is announced that construction of a new structure will be postponed for the duration, due to financing difficulties and material priorities.

Rolling mills and fabricating shops are booked full, some plants reporting backlogs to the end of 1942. Additional tonnages are being placed by defense contractors under blanket agreements. Pacific Car & Foundry Co. has 3500 tons for an unstated number of shipyard cranes. Henry Georg, Spokane, has the general contract for an army hangar involving 2200 tons or 4500 tons of shapes, depending on final decision. Alaska Road Commission will receive bids at Seattle, March 25, for 14 steel bridges in Alaska calling for 1240 tons. On the same date Bonneville will open tenders for structures at nine substations. orthern Pacific railroad will rebuild and erect several new steel bridges in Washington state, eight crossings involved. United States engineer received no offers for construction of two steel bridges at Walla Walla, Wash.

Canada

Toronto, Ont.—Despite the fact that all other steel producers in Canada now have raised their prices $5 per ton, the Steel Co. of Canada Ltd. continues at the old price. However, all producers are accepting orders only for future delivery at prices prevailing at time of shipment. Shipments going forward now from the company are $5 per ton under competitors.

Toronto Shipbuilding Co., which has been held up by lack of steel for its shipbuilding operations, has obtained larger deliveries in the past few days and is increasing activity. Further supplies of plates and standard shapes have been shipped and additional quantities are expected daily. Improvement in plate deliveries largely is from Canadian mills. It is reported that plates from the United States are still slow and are affecting shipbuilding operations in a number of plants. In addition to shipbuilding a large part of Canada's output of plates is being diverted to plants

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Field Engineers and Sales Offices located in 30 Industrial Centers

DOUBLED CAPACITY FOR WAR PRODUCTION

Stepping up our productive capacity month after month has barely enabled us to keep pace with mounting war orders. As long as this condition exists, it becomes increasingly difficult to meet civilian requirements. Our one big job is the handling of war material. That job must come first.

engaged in war tank construction, in an effort to increase deliveries of these machines to battle fronts.

Under pressure of increasing demand on war account, bar deliveries are being extended farther. Local mills representatives state that on new bar orders delivery cannot be promised in less than nine months, and only small supplies are available through warehouses. Most stocks have been frozen and can be used only by approval of the Steel Controller.

Merchant pig iron demand has been more persistent, with melters making special appeals to the Steel Controller for supplies to enable them to keep plants on schedule operation. Foundry iron sales rose to about 6000 tons, while malleable was around 3000 tons. Basic, going to electric furnace operators, is moving at around 1500 tons per week.

Scrap collections continue to improve under better weather conditions. Most incoming scrap is in steel grades. Demand for steel grades is expanding steadily and when surplus stocks are cleaned out under the proposed nation-wide collection program, there will be little chance of meeting all Canadian demands from domestic supply. Minor betterment was reported in cast scrap offerings during the week, but supply continues far short of requirements.

Tin Plate

Tin Plate Prices, Page 111

Tin plate production is decreasing, with curtailments scheduled at almost all plants. The national rate is estimated at 80 per cent, compared with a record 85 per cent the preceding week, with individual rates varying considerably, depending on pig tin supply.

Lower production is expected but the rate may be held an artificial level until the packing season by releasing tin scheduled for later use. This action would be balanced by abnormally low production late in the year. Supply of semifinished steel may be the governing factor in determining where reduction may best be made, as it is more feasible to supply steel at some points than others.

Semifinished Steel

Semifinished Prices, Page 110

Demand for semifinished steel for the ordnance program is taxing facilities of integrated companies. Rail mills have heavy allocations of shell rounds, interfering with domestic rail programs. Export rails under lend-lease take precedence of domestic rails. Some short domestic spur lines and sidings for war plants have been given directives over shell rounds recently.

Nonintegrated bar, sheet, pipe and wire mills find lengthening of deliveries on their semifinished supplies and large lots have been canceled where ratings were too low to give hope of delivery. Plans for semifinished steel allocations have not been worked out and earlier rating plans have been deferred as promising no relief.

Coke Oven By-Products

Coke By-Product Prices, Page 111

As war requirements increase, civilian requirements of coke oven by-products are correspondingly curtailed, supplies in some instances having practically halted. From coking operations, production has probably reached or is nearing a peak, with several additional toluol plants to be built. Toluol output is being directly allocated for munitions. Benzol sales are heavier, while industrial demand for phenol and naphthalene is heavy. Drop in requirements for the lacquer-automobile trade is more than made up in other directions.

Producers and sales agents of benzol, toluol, xylol and solvent naphtha obtained from by-product coke ovens have been asked by OPA to continue first quarter prices through second quarter.

Prices prevailing in first quarter were established following a similar request by OPA last December.

Ferroalloys

Ferroalloy Prices, Page 112

When ferroalloy prices were reaffirmed recently for second quarter spiegeleisen prices were held up, along with ferromanganese, the latter usually affecting spiegeleisen.

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INLAND 4-WAY FLOOR PLATE!
• It prevents slipping
• It is fireproof
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The delay is to await action by OPA on requests for higher ferromanganese price, which is expected during this month. Meanwhile spiegeleisen is steady at $36, Palmerton, Pa., for 19-21 per cent.

First Ore Carriers Leave Lower Lake Ports

Vanguard of the iron ore and coal fleet steamed out of the lower lake ports and headed for the upper lakes last week, opening the 1942 shipping season 12 days earlier than in 1941, and the earliest in history.

First vessels moving into the lake were fourteen cariers of the Cleveland-Cliffs Iron Co.'s fleet of 23. Last year the same fleet gained about ten days on other fleets by dispatching about a dozen vessels from various lower lakes winter ports. First ore to arrive last year came in April 9 on a Cleveland-Cliffs vessel.

The Coast Guard's Cleveland district headquarters reported progress being made at the Soo by the carferry icebreaker and four tugs. One of these was reported in ice 20 miles west of Old Mackinac Point in the Straits of Mackinac, and another downbound was making good progress in the lower St. Mary's river.

Assignment of fleet officers to vessels and the final meetings for instructions have been concluded by most of the fleets in Cleveland.

In the Michigan-Wisconsin and Mesabi ore mining regions, mine operators have been making every effort to be ready for the early opening.

OPA announced last week a price ceiling on iron ore will be established soon, based on $4.45 a ton for Mesabi nonbessemer, delivered at lower lake ports, and at customarily related prices for other grades. The proposed maximums are the same as those now quoted by STEEL.

Iron Ore

Iron Ore Prices, Page 113

February consumption of Lake Superior iron ore totaled 6,403,362 gross tons, compared with 7,158,423 tons in January and 5,673,166 tons in February, 1940. Ore on hand at furnaces and Lake Erie docks March 1 totaled 27,525,822 tons, compared with 33.919,063 tons a month earlier and 24,195,165 tons a year ago.

Furnaces in blast March 1 numbered 178, of which 171 were in the United States and seven in Canada, the same as on Feb. 1. A year ago 162 stacks were in blast in the United States and two in Canada.

Steel in Europe

Foreign Steel Prices, Page 113

London—(*By Cable*)—There is little change in the general trend of the steel and iron market in Great Britain, the greater part of output going to war purposes. Emphasis continues on heavy plates and special steels. Terne plate for manufacturing oil containers is in strong demand. Close control of steel has placed limits on the number of steel specifications.

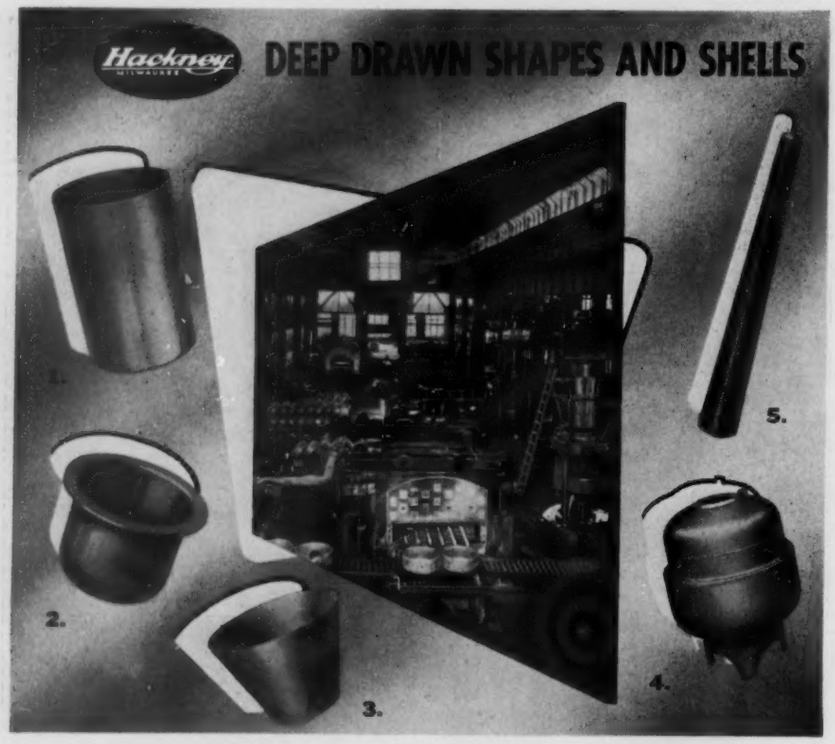
Nonferrous Metals

New York—WPB is extending its restrictions on use of metals for nonessential products to the Army and Navy. Copper flashings for Army cantonments are banned, while articles on list A in the tin conservation order M-43-a must not have any tin used in their manufacture after April 1, either for governmental agencies or for private contract.

Copper—Both WPB and OPA are trying to increase still further the production of refined copper. This may result in a cut in output of copper alloy ingots so that more scrap may be diverted into the refineries. WPB may order Maritime Commission to give Chilean and Peruvian copper a higher priority for shipping space.

Lead—Tin conservation orders are boosting the demand for lead since higher lead content coatings and alloys will be used in place of the tin materials. Supplies continue ti hold at about 75,000 tons monthly.

Zinc—American Zinc Institute estimates 1942 output will consist of 44.5 per cent of high grade and 55.5 per cent of all other grades



HACKNEY FACILITIES ARE USED TO SOLVE MANY MANUFACTURING PROBLEMS

● In hundreds of plants—in many industries—manufacturers are availing themselves of Hackney facilities. By using Hackney deep drawn shells, they have been able to increase the advantages of their product.

Pressed Steel Tank Company are specialists in the manufacture of seamless deep drawn shells and shapes of various sizes. Each shell is drawn from a solid circular sheet or plate of open hearth steel by means of high pressure hydraulic presses especially designed for this work. Hackney's Special Cold Drawing Process results in smooth finish, uniform thickness and temper. It assures elimination of laminations in the finished product.

Let Hackney engineers help you develop new shapes and shells or improve on those now being used. Many times production has been speeded up, and the cost of an individual part reduced. Frequently overall weight is lowered—at other times strength is increased—while often both results are obtained. Write today for full details.

1. Plain Open End Shell 24" diameter, 46¾" long. 2. Flanged Shell 14" diameter, 16" high. 3. Special Tapered Shell 22" diameter, 15" high. 4. Heat Exchanger 29" diameter, 46" long. 5. Diffuser Tube 4" diameter, 24" high.

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Hackney

CONTAINERS FOR GASES, LIQUIDS, AND SOLIDS

Nonferrous Metal Prices

Mar.	Copper: Electro. del. Conn.	Copper: Lake. del. Midwest	Copper: Casting, refinery	Straits Tin, New York: Spot	Straits Tin, New York: Futures	Lead N. Y.	Lead East St. L.	Zinc St. L.	Aluminum 99%	Antimony Amer. Spot, N.Y.	Nickel Cathodes
1-20	12.00	12.12½	11.75	52.00	52.00	6.50	6.35	8.25	15.00	14.00	35.00

F.o.b. mill base, cents per lb. except as specified. Copper brass products based on 12.00c Conn. copper

Sheets

Yellow brass (high)	19.48
Copper, hot rolled	20.87
Lead, cut to jobbers	9.75
Zinc, 100 lb. base	13.15

Tubes

High yellow brass	22.23
Seamless copper	21.37

Rods

High yellow brass	15.01
Copper, hot rolled	17.37

Anodes

Copper, untrimmed	18.12

Wire

Yellow brass (high)	19.73

OLD METALS

Dealers' Buying Prices

No. 1 Composition Red Brass

New York	9.50
Cleveland	9.25-9.50
Chicago	9.50
St. Louis	9.50

Heavy Copper and Wire

New York, No. 1	10.00
Cleveland, No. 1	10.00
Chicago, No. 1	10.00
St. Louis	10.00

Composition Brass Turnings

New York	9.25

Light Copper

New York	8.00
Cleveland	8.00
Chicago	8.00
St. Louis	8.00

Light Brass

Cleveland	6.25-6.50
Chicago	6.50
St. Louis	6.50

Lead

New York	5.25-5.50
Cleveland	5.40-5.50
Chicago	5.25-5.60
St. Louis	5.25-5.35

Old Zinc

New York	5.00-5.25
Cleveland	5.25-5.50
St. Louis	4.50-5.00

Aluminum

Old castings	10.50
Segregated borings	8.50
Old sheet	10.50
Clips, pure	9.50

SECONDARY METALS

Brass ingot, 85-5-5-5, l.c.l	13.25
Standard No. 12 aluminum	14.50

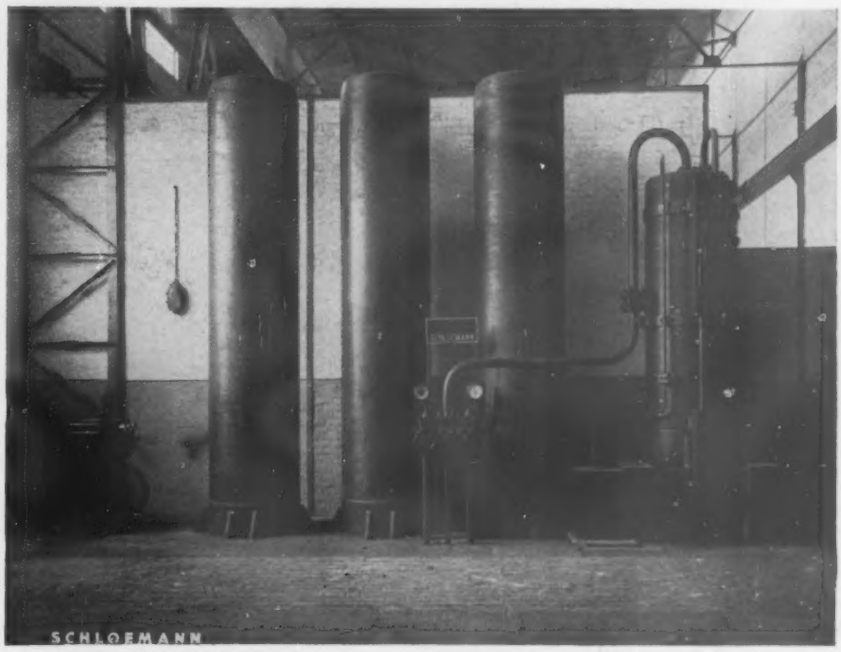
compared with percentages of 43 and 57 in 1941. The Institute estimates that scheduled production together with imports should develop a total supply of 1,000,000 tons in 1942 and 1,074,000 tons in 1943 with further expansion under consideration.

Tin — MRC continues to buy about one-half of the Bolivian ore supply on the basis of 50.00c for refined tin, although MRC's selling price for grade "A" tin is 52.00c. Conservation orders are drastic but they are stretching supplies.

$7,500,000 for Granite City Steel Expansion

Granite City Steel Co., Granite City, Ill., has completed negotiations with Defense Plant Corp. for a steel mill costing $7,500,000, to increase ingot and plate producing capacity. Hayward Niedringhaus, president, announces the plant will be leased to the company with an option to purchase under certain conditions.

Earnings last year, he said, were affected by freezing of prices on finished material and rising costs of raw materials. Pig iron supply has been helped by blowing in of a blast furnace by the Koppers Co., from which hot metal is obtained.



AIR-HYDRAULIC ACCUMULATOR

SCHLOEMANN Air-Hydraulic Accumulators are completely automatic. Fundamentally they consist of a Water Container, an Air Container and Electrically Controlled Regulating Apparatus.

The control of the water at the highest and lowest levels is by means of switches operated by floats contained in chambers of a communicating tube of the water bottle. The switch in the upper chamber controls the operation of the pump while that in the lower chamber controls the check valve which shuts off the accumulator at low water level.

- HYDRAULIC PRESSES
- EXTRUSION PRESSES
- HIGH PRESSURE PUMPS - DOUBLE ACTING DUPLEX TYPE
- ENGINEERING OF COMPLETE HYDRAULIC SYSTEMS

SCHLOEMANN
ENGINEERING CORP. PITTSBURGH, PA.
Rolling Mill Machinery Hydraulic Presses

British Report

(*Concluded from Page 34*)

for the shipbuilding industry and rolling mills are likely to be working to capacity for many months.

The same cannot be said in regard to heavy structural material for construction. Only a limited amount of this steel is being called for under present circumstances. Developments in the far East have put a greater strain on the British Navy and shipping space in the mercantile marine must be curtailed. It is clear that imports of steel will be drastically reduced if not stopped altogether, but fortunately users of foreign steel have built up supplies which will stand them in good stead during the coming months.

The position as far as semifinished materials are concerned is comfortable and likely to remain so for some time. Moreover, it may be that under the government's concentration schemes some of the rerolling mills will have to close down or change over to other work.

An order recently issued restricts the manufacture of galvanized sheets. In future galvanized sheets will be produced in small quantities and only for special government orders. Means will have to be found for coating sheets to prevent deterioration, other than the use of spelter. Existing orders for sheets, however, will be carried out.

Tin plate makers have been informed by the Ministry of Supply that more supervision will have to be exercised in all departments in order to reduce the heavy percentage of wasters arising. Moreover, all wasters that may arise, whatever the percentage, must now be taken against prime contracts unless the consumer has a special permit from the Ministry of Supply giving exemption from this condition. Discussions have been proceeding between the Ministry of Supply and consumers on the subject of the use of uncoated plates instead of tin plate, and it is stated that in future permits will only be granted for so-called "unassorted tin plate base (uncoated)" for many purposes where tin plate has been used up to the present and that the basis price of this class of material will be 4s less than the home trade quotation. Another suggestion by which tin consumption in the tin plate industry can be reduced is the use of terne plate, wherever possible in place of tin plate and there seems little doubt that terne plate production will be increased. Terne plate, is not, of course, suitable as substitutes for tin plate in more than a certain number of directions, but wherever possible they will be used to conserve Britain's tin supplies. All this has been brought about by the Japanese invasion of Malaya and the Dutch East Indies, thus endangering Britain's tin supplies.

Look For Labor Drain

Another side to the question is that the possibility of a further drain on skilled labor has to be faced, more especially among mill men. However, developments in this direction will no doubt depend upon official requirements of tin plate. Meanwhile, deliveries of oil plates are being maintained on quite a high level and makers have not very much room left on their order books for the next two or three months.

The scrap position is engaging the attention of the government. The Ministry of Works can call for returns of disused machinery and scrap metal at manufacturers' premises of all kinds, including engineering, shipbuilding and mining. There is no intention to take valuable machinery which must be preserved for use after the war, and that of firms closed by concentration schemes will not be requisitioned.

A recent appeal by a member of parliament to the public to assist the Ministry of Works to locate iron and steel scrap for munitions has brought a remarkable response. New drives are being instituted and there is no doubt that the steel industry will need a very big tonnage during the coming months. Indeed some merchants anticipate a tightening up in supply and demand in a very short time unless something can be done in the meantime. Labor difficulties in the collection and sorting of scrap tend to aggravate the problem.

For some years, rebates have been obtainable by purchasers of vari-

Here's the **WIRE SITUATION**

★ Deliveries are controlled by government. PAGE mills are at capacity. As a user of wire, there are things you might do.

SHAPED WIRE. Use a standard shape. Avoid special runs. A wide variety of shapes is available: oval, hex, octagonal, square, channel, keystone, etc.; diameters to ⅜", end section areas to .250 sq. inches.

WELDING ELECTRODES. Conserve. Check with PAGE Distributor. Be sure your rods are correct in analysis and diameter. Insist that your men do not bend electrodes and that they use each one down to the holder.

GENERAL WIRE. Change in analysis, shape or diameter might improve your position. Check waste. The situation in such products as Spring Wire, Bond Wire, Telephone Wire, etc. is not subject to early improvement.

If PAGE experience can help work out changes, our cooperation is yours.

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AMERICAN CHAIN & CABLE COMPANY, Inc.

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ous iron and steel products under certain conditions. These rebates, which in normal times were an important factor in encouraging the use of British material, ranged from 5s on pig iron to 15s on specified finished steel products, including certain rerolled products. It has hitherto been the practice to charge the full invoice price, users making application for the rebate on their purchases after three months.

Since there is no longer a choice between British and continental material and the general situation in other respects has rendered the rebate scheme largely if not wholly inoperative, it has now been arranged for the rebate to be deducted from the invoice price, and the net price will be charged, the object being to avoid an unnecessary waste of time and labor and to reduce paper consumption. However, the rebate scheme will remain in being, the change in procedure being purely a wartime measure.

Trend of wages in British industry is still upward and recent figures issued by the Ministry of Labor show the extent to which they have risen since October, 1938. As only one example of this, men in the metal, engineering and shipbuilding industries with an average earning of 75s in October, 1936, are now being paid 112s.

Scrap Committee Named To Function With OPA

A regional advisory committee on scrap under OPA price regulations was formed last week at a meeting in Philadelphia of iron and steel scrap dealers from New York City, New Jersey, Delaware, eastern and central Pennsylvania, Maryland and eastern Virginia.

Those appointed were Frank Contey, Frank Contey Inc., Jersey City, N. J.; Israel Citron, Citron-Byer Co., Trenton, N. J.; Barney H. Rubine, Hudson Iron & Metal Co., Bayonne, N. J.; Herman Moskowitz, Schiavone-Bonomo Corp., Jersey City, N. J.; Frank Millner, Frank Millner Co., Trenton, N. J.; Joel Claster, Luria Bros. & Co. Inc., Philadelphia; Abe Pollock, Mayer-Pollock, Pottstown, Pa.; Harry Kirchmana, Allegheny Iron & Metal Co., Philadelphia.

Others named included Tomas Bentivoglio, Camden Iron & Metal Co., Camden, N. J.; Gus Pollock, Bridgeton, N. J.; Jacob S. Shapiro, United Iron & Metal Co., Baltimore; Marvin S. Plant, Klaff & Co., Baltimore; Hyman Hyatt, Iron & Metal Co., Arlington, Va.; Hyman H. Block, N. Block & Co., Norfolk, Va.; Ban Luria, Luria Iron & Steel Co., York, Pa.; George Nutman, Newton Iron & Steel Corp., Brooklyn, N. Y.; A. A. Gerson, Harlem Metal Corp., New York; Marvin Lipman, Aero Scrap Iron Metal Co., New York; Arnold Winstein, Independent Scrap Iron Corp., Brooklyn, N. Y.; Robert Joseph, Commercial Steel & Chemical Corp., New York.

Government Seizes Old Missouri Stack

A blast furnace owned by the former Missouri Valley Iron Co., St. Louis, has been commandeered by the federal government under the requisitioning act passed by Congress last October, according to the *St. Louis Globe-Democrat*. The stack will be dismantled and shipped to the Nacional Financiera, Mexico City, by the American Rolling Mill Co. as agent.

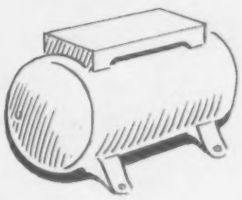
The stack was last operated in 1924 and was last remodeled during World War 1. It has a height of 76 feet, hearth of 15 feet, four stoves, two blowing engines and annual capacity of 108,000 tons of pig iron.

Compliance Branch of the WPB Division of Industry Operations has announced it soon will undertake an investigation of pig iron distribution to check compliance with allocation orders.

Here's a REALISTIC ANSWER TO WAR PRODUCTION PROBLEMS . . .

SCAIFE sub-contracting FACILITIES

1 Release your machinery and equipment for vital war production by letting Scaife make your cylinders, tanks and other containers for liquids, air or gases. You'll get an expert job and speed your production.



2 Augment your own facilities by sub-contracting to Scaife the making of cylindrical or welded products, or any manufacturing operations involving the following:

- ✓ Arc Welding—hand, automatic or semi-automatic.
- ✓ Brazing—Spot Welding.
- ✓ Drilling and Tapping.
- ✓ Hot-dip galvanizing.
- ✓ Pressure Testing.
- ✓ Drawing and Stamping.
- ✓ Hot or Cold Riveting.

For 100% War Production—put SCAIFE in your production line!

SCAIFE COMPANY
General Offices and Works:
OAKMONT, PA.
(Pittsburgh District)
Representatives in Principal Cities

Crowding Air Compressor Capacity to the Limit?

One simple way to get more out of the air power now available, avoid additional compressor investment, and improve efficiency, is to install Hannifin Pressure Regulating Valves. Many jobs on arbor presses, air chucks, riveters, air vises, cylinders, and other pneumatic machinery can be better handled at half the ordinary line pressure.

Providing a pressure regulator for each individual machine not only means efficient use of the air power available, but allows quick and easy adjustment for different types of work. The exclusive piston-type design of Hannifin Pressure Regulating Valves provides large volumetric capacity and sensitive, accurate control of working pressures. Adjustment can be made over the entire working range to deliver any reduced operating pressure desired. Construction is simple for long, dependable life without maintenance.

Three standard sizes—⅜, ½, and ¾ inch, for use on initial pressures up to 150 lbs. Furnished complete with pressure gauge. Write for Bulletin 56-S.

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SCIENTIFIC COMMERCIAL STEEL TREATING

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Flame Hardening • Annealing • Aerocasing
Bar Stock Treating and Straightening
Heat Treating • Pack or Gas Carburizing
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Cyaniding • Nitriding • Hi-Speed Hardening

THE LAKESIDE STEEL IMPROVEMENT CO.
5418 Lakeside Avenue CLEVELAND, OHIO Phone Henderson 9100

Speed Bomb Output By Spinning Process

(*Concluded from Page* 35)

pany is speedy and effective. The process is one in which many government officials as well as commercial operators now converting their plants to war production have shown great interest.

In developing the new process, heavy industry has taken a leaf from the book of the ancients, and utilizes, with great modern machines, the methods of the potter and his wheel. A pre-heated steel tube, turned at a high rate of speed, is fashioned quickly and with surprising precision, into the nose and main body of a bomb by a huge arm which swing into position and molds the revolving tube into the desired shape. Other machines, by the same method, shape the tail portion of the main bomb body with the ease of an old time potter forming his whirling clay.

Bombs of various sizes are made by this method, and after they leave the spinning machines they are normalized, finished, threaded, have carrying lugs welded on, are painted and shipped to loading plants as the first leg on their journey toward action.

About the same time that British soldiers were evacuating Dunkirk, bomb production on a large scale began at this plant after months of research, experimentation, and limited production in an amazingly short time, men were trained to operate the great machines and to work effectively in the important finishing lines.

Tool Builders Warned Of Nickel Shortage

George C. Brainard, chief, WPB Tools Branch, last week warned machine tool builders the nickel shortage is becoming more acute and that the builders now face a situation where no nickel will be available for use in machine tools. Mr. Brainard suggested the builders immediately proceed to look for possible substitutions.

Blaw-Knox Reports Net Sales Reach All-Time Record

Net sales of Blaw-Knox Co., Pittsburgh, reached a new high in 1941, according to the company's annual report released last week by William P. Witherow, president. Last year's sales, largely reflecting the company's war effort, were $30,799,560, compared with $18,481,802 in 1940 and $13,065,144 in 1939.

Net profit, after all charges including taxes, was equal to $1.25 a share, compared with $1.02 a share in 1940.

Here's why

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A genuine interest in your comfort by everyone from manager to doorman.

Food that has made our four restaurants famous.

Deep beds, crisp linen, modern furnishings planned for comfort.

Gay music for dancing, or calm quiet if you prefer.

Convenience that saves time and money. Hotel Cleveland adjoins the Union Terminal and Terminal Garage, and is next door to everything you'll want to see in Cleveland.

HOTEL CLEVELAND *Cleveland*

CONSTRUCTION and ENTERPRISE

Michigan

BAY CITY, MICH.—Henry C. Weber Construction Co., Bay City, has been awarded contract for addition to plant of Bay Mfg. Division of Electric Auto-Lite Co. here.

DEARBORN, MICH.—Bryant & Detwiler Co., 2304 Penobscot building, Detroit, has general contract for construction of magnesium smelter at the Rouge plant of Ford Motor Co. Giffels & Vallet Inc., Detroit, architect and engineer.

DETROIT—Gallagher Construction Co., 2136 Connor street, Detroit, has been awarded contract for $90,000 addition to plant of Aeronautical Products Co. Derrick & Gamber, Inc., 3500 Union Guaranty building, architect.

DETROIT — Atlas Engineering Co., 11725 Strathmoor, has let contract to Jos. M. Worswick for addition to its factory. Paul R. Sewell is architect.

DETROIT—Federal Mogul Corp., 11031 Shoemaker street, has awarded contract to W. J. C. Kaufmann Co., 10610 Shoemaker street, for addition to its factory.

DETROIT—Hercules Tool & Engineering Co., 6451 Dubois street, has been incorporated to manufacture jigs, tools, etc. Correspondent: Ralph Beecroft, 12639 Indiana avenue.

DETROIT—Smith Automatic Heater Service Inc. has been incorporated with $10,000 capital by William O. Smith, 19250 John R street, to manufacture automatic heating equipment.

DETROIT—American Gage Corp. has been incorporated with $25,000 capital to manufacture tools. Correspondent: Michael J. Morris, 324 East Kirby avenue.

DETROIT—Triple-A-Machine Products Inc., 9214 Otsego, has been organized to manufacture machine parts, tools, etc. Robert Anderson, 2045 Cameron avenue, representative.

FERNDALE, MICH.—Special Machine & Engineering Inc., 3949 East Nine Mile road, has been organized with $50,000 capital to manufacture tools, gages, etc. Representative: Gerald R. Marshall, 18611 Cherrylawn avenue.

GRAND RAPIDS, MICH. — Wolverine State Tool & Die Co. Inc. has been incorporated with 6000 shares of no par value by William DeVries, 123 Home street, to engage in machine shop work.

GRAND RAPIDS, MICH.—H. B. Rohloff, Grand Rapids, has been awarded contract for construction of $25,000 chemical plant here for Haviland Products Co.

GRAND RAPIDS, MICH.—Work has been started here on $30,000 addition to plant of Grand Rapids Stamping Division of General Motors Corp. Faulkner Construction Co., Detroit, has the contract.

HOWELL, MICH. — Bruce Products Corp. is preparing plans for rebuilding plant recently destroyed by fire.

JACKSON, MICH. — Paul Tilds, 2539 Woodward avenue, Detroit, is preparing plans for an addition and alterations to a plant here.

MUSKEGON, MICH.—Ground has been broken here for an addition to the plant of Muskegon Piston Ring Co.

YPSILANTI, MICH.—Motor State Products Co., Ypsilanti, has let contract to DeKoning Construction Co., Ann Arbor,

Wellman craftsmanship in aluminum—a cast Pneumatic Tool Housing.

Aluminum Castings

BY WELLMAN

Whether your casting requirements are simple or complicated, you can rely on Wellman for production that is exact in every particular. Our competent personnel with 31 years' experience plus the most modern equipment and new plant facilities insure precision quality.

Due to additional plant facilities, deliveries on castings in all metals are being made promptly.

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Aluminum
Copper Silicon—Heat Treated

Bronze
Phosphor—Manganese—Government — Ampco

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● **Use BISCO Tool Steel Tubing and stop the waste of costly steel. At 40c a pound, this company had $17.20 worth of turnings to sweep up. Defense needs the time, labor and materials which are unnecessarily lost through milling a solid bar.**

BISCO Non-shrinkable, Oil-hardening Tubes are stocked in exact sizes. When cut to your specifications, they are ready for use as ring dies, bushings, spacers, etc.

Ease your struggle for greater defense production at lower cost. Conserve man-and machine-power —use Tool Steel Tubing!

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Mich., for addition to its factory. R. S. Geranoff, Ypsilanti, architect.

Connecticut

HARTFORD, CONN.—Cushman Chuck Co., 806 Windsor street, has asked bids for two-story plant addition.

WESTPORT, CONN. — Sealund Corp., 589 Riverside avenue, will build research and assembly plant, to cost about $45,000.

Maine

BATH, ME.—Hyde Windlass Co., 2 Federal street, will take bids soon for two-story 100 x 300-foot factory. Cost over $40,000. A. J. Harriman, 53 Front street, architect.

FREEDOM, ME.—Monmouth Canning Co., 256 Commercial street, Portland, Me., is preparing plans for packing plant, to cost about $40,000.

Massachusetts

HUDSON, MASS.—Owner, care of E. V. Aldrich, architect, 46 Lincoln street, has plans nearing completion for one-story 50 x 90-foot plant. Estimated cost $62,000.

New York

ASTORIA, N. Y.—Morey Machinery Co. Inc., 4-57 Twenty-sixth avenue, Long Island City, has plans by R. L. Lukowsky, 20-03 Newtown avenue, Long Island City, for one-story factory; estimated cost $75,000.

JAMESTOWN, N. Y.—Art Metal Construction Co., A. Larsen, president and general manager, plans plant addition. Cost over $40,000.

JAMESTOWN, N. Y.—E. A. Jacobson, 7 Clark avenue, plans erection of one-story 60 x 100-foot industrial building, costing $40,000.

NEW YORK—National Lead Co., 1816 Trinity building, New York, will construct a plant in Tennessee to manufacture metallic magnesium.

New Jersey

AMPERE, N. J.—Crocker Wheeler Electric Mfg. Co. has let contract to John W. Ferguson Co., 152 Market street, Paterson, for one-story 140 x 250-foot plant. Estimated cost $150,000.

CLIFTON, N. J.—Eastern Corrugated Container Co., 86 Thirty-fourth street, Brooklyn, N. Y., has had plans prepared by S. Shaw, 24 Walnut street, Newark, for altering one-story 50 x 60-foot plant addition. Cost $50,000.

JERSEY CITY, N. J.—Transport Steel Products Inc. has been incorporated with $10,000. First National Bank, Jersey City, is agent in charge.

NEWARK, N. J.—Colton Electric Mfg. Co. has plans by Wolf & Gluckman, 850 Board street, for factory alterations and addition, to cost over $40,000.

TRENTON, N. J.—Sloane-Blabon Corp. has let contract for erection of plant addition to cost $18,000.

UNION CITY, N. J.—Steel Corp. of New Jersey has been incorporated with 200 shares of stock, with Jay M. Levenson as agent in charge.

Ohio

CANTON, O.—Canton Smelting & Refining Co. will erect shop and office buildings totaling 30,000 square feet of floor space at 2049 Dueber avenue. M. S. Silver is president.

CLEVELAND—Aeroil Engineering Co. is being incorporated to manufacture an undisclosed type of machinery. C. E. Needham, vice president, Chandler Products Corp., 1491 Chardon road, is agent for the new firm. Sydney A. Davies, of Davies & Eshner, Union Commerce building, is handling legal details.

CLEVELAND—Sabin Development Co., O. C. Sabin, secretary-treasurer, is starting expansion of machine shop at 6603 Carnegie avenue.

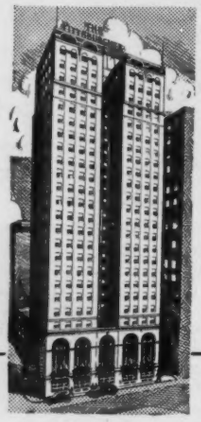
CLEVELAND — Burdett Oxygen Co., 3300 Lakeside avenue, is considering plant expansion. William H. Loveman is president.

CLEVELAND—Cleveland Trencher Co., 20100 St. Clair avenue, manufacturer of excavating machinery, will expand factory by 2400 square feet.

CLEVELAND—White Motor Co., 842 East Seventy-ninth street, will extend assembly plant by 70,000 square feet. Robert F. Black is president.

CLEVELAND — Laganke Electric Co., 2400 Woodland avenue, Wilbur Laganke, president, is planning to add 2000 square feet to factory.

CLEVELAND — Thornton Co., 6901



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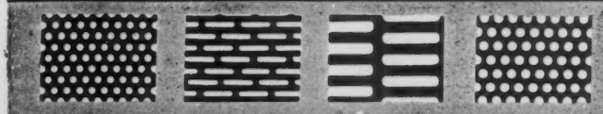

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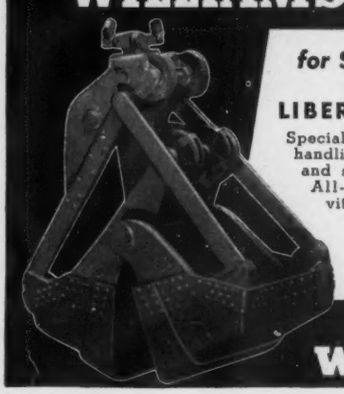

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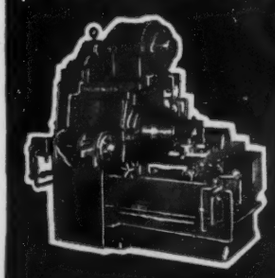

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Morgan avenue, will enlarge metal-working plant with addition of 12,000 square feet. Frank A. McCloud is president.

CLEVELAND—Austin Co., Cleveland, is reported to be supervising contractor for aircraft bomber plant in Georgia, to be operated by Bell Aircraft Co., Buffalo. Estimated cost $30,000,000.

LORAIN, O. — F. J. McFadden, 442 Oberlin road, architect, has prepared plans for factory building to be erected near here.

MT. GILEAD, O.—North Electric Co., Galion, O., care of Attorney Ellison S. Kauffman, Mt. Gilead, will establish branch assembly plant here, in connection with manufacture of switchboards and other communications equipment at Galion plant.

SANDUSKY, O. — Farrell-Cheek Steel Co. plans construction of additional building, furnaces and equipment which will double present output.

WELLINGTON, O.—Sterling Foundry Co. will soon undertake a $500,000 expansion program which will increase output of gray iron castings to 1500 tons per month. Three buildings will be erected and considerable equipment will be added. Austin Co., Cleveland, is contractor.

YOUNGSTOWN, O.—McCabe-Riley Machine Corp. has been organized to do screw machine and turret lathe work by John A. McCabe, 618 Pasadena avenue, and Forest L. Riley, 3602 Hudson drive.

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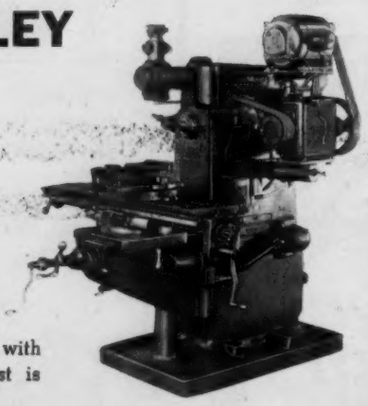

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Pennsylvania

EASTON, PA.—Lehigh Foundries Inc., F. E. Shumann, president, is rebuilding portion of plant. Cost over $50,000.

WATSONTOWN, PA. — Watsontown Cabinet Co., F. W. Rombach, president, will spend approximately $250,000 for plant addition and converting warehouse into manufacturing space.

MIDLAND, PA.—Air Reduction Sales Corp., H. Van Fleet, vice president in charge of operations, Lincoln building, New York, plans factory additions and alterations here. Estimated cost $75,000.

Illinois

EAST PEORIA, ILL.—Caterpillar Military Engine Co. has been incorporated with 10,000 shares of common stock, by B. C. Heacock, L. B. Neumiller, A. T. Brown, T. R. Farley and W. Blackie, to manufacture engines and power units. Mr. Blackie is the registered agent.

GALESBURG, ILL.—Midwest Mfg. Co. has let contract to Kaiser-Ducett Co., 80 East Jackson boulevard, Chicago, for plant buildings. Estimated cost $65,000.

JACKSONVILLE, ILL. — National Enamel Stamping Co. will build several small units here as an addition to the present large plant nearing completion.

ROCKFORD, ILL.—Rockford Machine Tool Co. will build three additions to its plant at cost of $36,000.

STERLING, ILL. — Lawrence Bros. Mfg. Co. has been granted permit to build boiler room costing $24,000.

Indiana

ANDERSON, IND.—Stokeley Bros. & Co., 491 North Meridian street, Indianapolis, plans plant extension costing $60,000, including equipment.

NEWCASTLE, IND.—Schacht Rubber Mfg. Co., Noblesville, Ind., is renovating recently purchased plant here. Estimated cost $100,000, including equipment.

Alabama

MOBILE, ALA.—Mobile Pulley & Machine Works, 650 South Ann street, will build one and two-story plant addition, costing $50,000.

Maryland

BALTIMORE—Arthur E. Bull, Monkton, Md., has contract for addition to factory on East Joppa road for Murray Corp. Lawrence E. Menefee, Morris building, Baltimore, architect.

BALTIMORE—General Elevator Co. has plans by F. L. W. Moehle & Associates, Professional building, for addition to plant on Bush street.

BALTIMORE—Davis Construction Co., 9 West Chase street, Baltimore, has been awarded contract for addition to plant of an industrial company, costing $200,000. H. E. Beyster Corp., General Motors building, Detroit, engineer.

Louisiana

BENTON, LA.—City plans $105,000 improvements to waterworks system.

Arkansas

PINE BLUFF, ARK.—J. L. Dameron will spend approximately $75,000 for erection of cannery, including equipment.

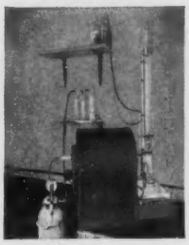
Oklahoma

OKLAHOMA CITY, OKLA.—City and Oklahoma county will vote soon on $2,250,000 bonds for plane assembly plant and other military establishments.

TULSA, OKLA.—War Department has authorized addition to manufacturing plant at cost of $5,000,000. Construction

MODERN ANALYSIS

Carbon Determinator



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Missouri

ST. LOUIS—St. Louis Steel Products Co. has purchased a four-story building at 2101 Chestnut street, containing 40,000 square feet of floor space, for expansion.

ST. LOUIS—H. B. Deal Inc., 1218 Olive street, St. Louis, has been awarded contract by War Department for manufacturing plant in Arkansas at cost of over $5,000,000. Construction will be supervised by United States engineer office, Vicksburg, Miss.

Wisconsin

MILWAUKEE — Wehr Steel Co. has been granted permit for a $30,000 addition to its foundry on West Mobile street.

MILWAUKEE—Vilter Mfg. Co., 2217 South First street, has plans by Eschweiler & Eschweiler, 720 East Mason street, for one-story 83 x 206-foot machine shop.

MILWAUKEE—Milwaukee Tool & Die Co., 3411 West Hopkins street, is considering erection of factory.

RACINE, WIS.—Belle City Malleable Iron Co. has let general contract for one-story 110 x 200-foot steel factory to Nelson & Co. Inc., 1550 Yont street.

Minnesota

RED WING, MINN. — Northern States Power Co., 2 South Barstow street, Eau Claire, Wis., plans electric power plant costing $1,500,000.

Texas

CORPUS CHRISTI, TEX. — Southern Pacific Railroad Co. will erect machine and repair shop at 1424 South Tancahua street.

HOUSTON, TEX. — Rheem Mfg. Co., 1401 Lockwood street, has let contract to H. K. Ferguson Co., Hanna building, Cleveland, for 40 x 60-foot extension to plant, to cost $10,000.

Iowa

CEDAR RAPIDS, IOWA — Link-Belt Speeder Corp. has started construction of $75,000 addition to its plant which will increase floor space by 20 per cent.

Arizona

MORENCI, ARIZ.—Phelps Dodge Corp. plans ore reduction and smelter plant expansion and improvements here.

California

DARWIN, CALIF. — Imperial Metals Inc. is constructing a mill costing more than $100,000, which will process 250 tons of ore per day.

LOS ANGELES—Valley Tools Inc. has been organized with $75,000 capital by John L. and Charles F. Taylor, of Maywood, Calif., and Eugene Saylor, Glendale, Calif. Charles B. Stewart Jr., 639 South Spring street, Los Angeles, is representative.

LOS ANGELES—Quality Tool Co. Inc. has been organized with $75,000 capital by J. E. McCullough, Los Angeles; Leonaine Racy, Huntington Park, Calif., and Helen B. Brown, Burbank, Calif. Representative: Charles B. Stewart Jr., 639 South Spring street, Los Angeles.

RICHMOND, CALIF.—L. H. Nishkian, engineer, 155 Sansome street, San Francisco, will soon let contract for one-story 110 x 280-foot machine shop.

SAN FRANCISCO—General Engineering & Dry Dock Co., 1100 Sansome street, has let contract for machine shop additions to Younger Bros., San Anselmo, Calif.

Washington

TACOMA, WASH.—Wilkeson Products Co., care of B. C. Grosscup, Republic building, Seattle, will build coke plant costing $200,000.

Canada

BATHURST, N. B.—Canadian Barrels & Kegs Ltd., Waterloo, Que., is considering plant addition here, to include installation to diesel power unit. Cost $40,000.

MONCTON, N. B.—Clarke-Ruse Aircraft Ltd., Dartmouth, N. S., Clarke Ruse, president, is completing plans for airplane repair plant here, estimated to cost about $100,000, with equipment.

BRANTFORD, ONT.—Brantford Coach & Body Ltd., Mohawk street, is making arrangements for further addition to plant to cost about $25,000. Schultz Construction Ltd., 45 Albion street, has contract for an addition now underway.

BRANTFORD, ONT.—Waterous Ltd., Market street, has had plans prepared and will soon let contracts for further addition to plant here to cost about $50,000. D. M. Waterous is manager.

LONDON, ONT.—Canadian Can Manufacturers Ltd., 284 York street, will let contracts soon through C. E. Marley Ltd., same address, for one-story plant addition.

ORILLIA, ONT.—Fahralloy Co. of Canada Ltd., 95 Barrie road, has let general contract to C. V. Bennett Construction Co. for plant addition to cost $125,000. Equipment to be purchased includes motors and machinery, overhead crane, electric driven air compressors, welding machinery, sand mixers or molding machines, electric furnace for heat treatment of castings, electric grinders and polishers.

TORONTO, ONT. — Rogers-Majestic (1941) Ltd., 622 Fleet street, has let general contract to Carr & Barnes Ltd., 481 Eglington avenue West, for plant addition to cost $75,000.

TORONTO, ONT.—Metal Stampings Ltd., Danforth avenue, Scarborough township, has let general contract to R. J. Hibbs Construction Ltd., 15 Trent avenue, for plant addition to cost about $35,000, with equipment.

TORONTO, ONT. — Dominion Bridge Co. Ltd., 289 Sorauren avenue, has given general contract to Anglin-Norcross Ontario Ltd., 57 Bloor street West, for construction of plant addition to cost $85,000, equipment extra.

TORONTO, ONT.—John Inglis Co. Ltd., 14 Strachan avenue, has given general contract to A. W. Robertson Ltd., 57 Bloor street West, for further additions to assembly building. Plans by Allward & Gouinlock, architects, 57 Bloor street West.

WELLAND, ONT.—Page-Hersey Tubes Ltd., 100 Church street, Toronto, has let general contract to Dickie Construction Co. Ltd., 17 Yorkville avenue, for plant addition. Plans by Margison & Babcock, engineers, 210 Dundas street West, Toronto.

WINDSOR, ONT.—S.K.D. Tool Co., 1673 Moy avenue, has given general contract to Wilfrid Loaring Construction Co., 1662 Ouellette avenue, for construction of plant addition, to cost about $35,000, with equipment.

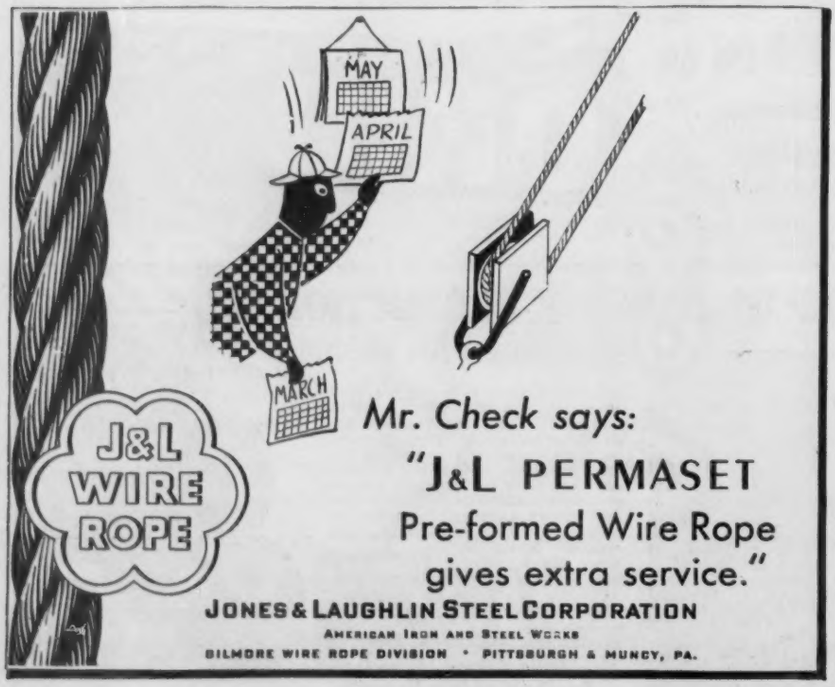
WINDSOR, ONT.—Ford Motor Co. of Canada Ltd. has had plans prepared by J. R. Porter, chief engineer, for plant addition to cost about $85,000, including equipment.

LAUZON, QUE.—Department of Munitions and Supply, Ottawa, H. H. Turnbull, secretary, has let general contract to Angus Robertson Ltd., 660 St. Catharine street West, Montreal, for construction of shipbuilding berths here.

LENNOXVILLE, QUE.—Union Screen Plate Co. of Canada Ltd., Main street, has let general contract to J. A. Verret Ltd., 67 Second avenue, Sherbrooke, Que., for plant addition to cost about $25,000, with equipment.

MONTREAL, QUE. — Department of Munitions and Supply, Ottawa, H. H. Turnbull, secretary, will call bids soon for war plant here. Estimated cost $1,500,000.

VILLE LA SALLE, QUE.—Jeffrey Mfg. Co., 300 St. Patrick street, has let general contract to A. F. Byers & Co. Ltd., 1226 University street, for two-story plant addition.



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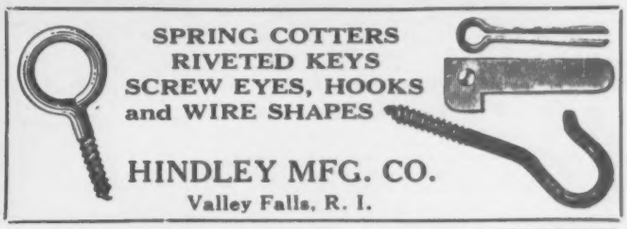
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GEAR PLANERS, Bevel 36" & 54" Gleason, M.D.
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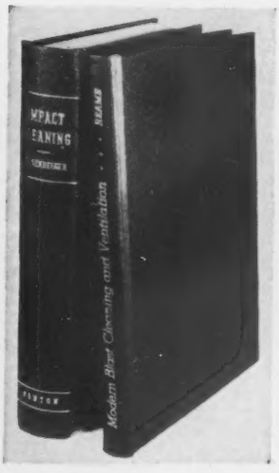

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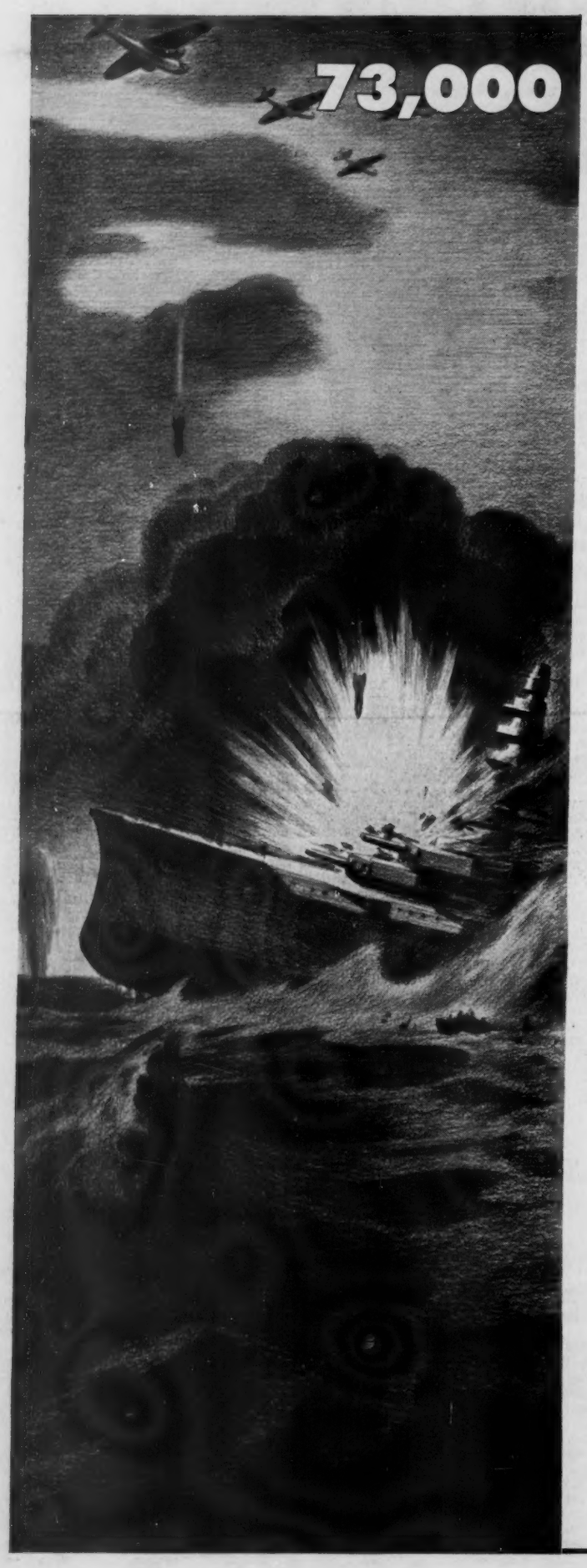

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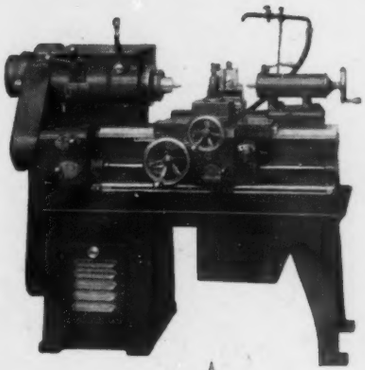

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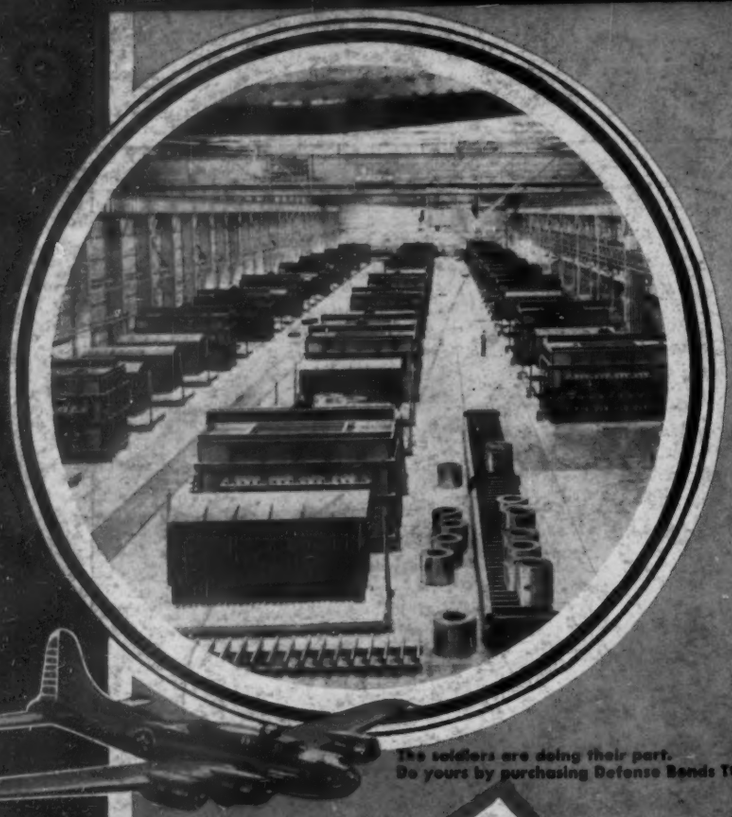

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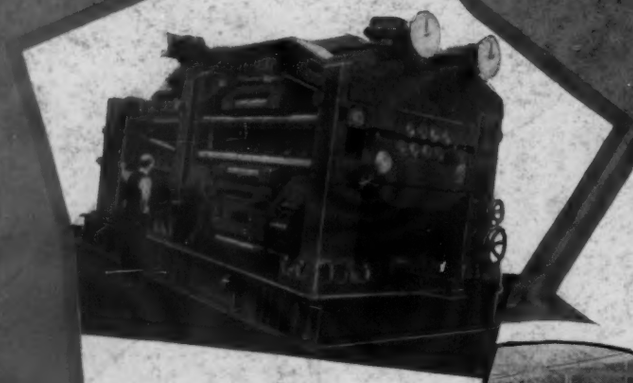

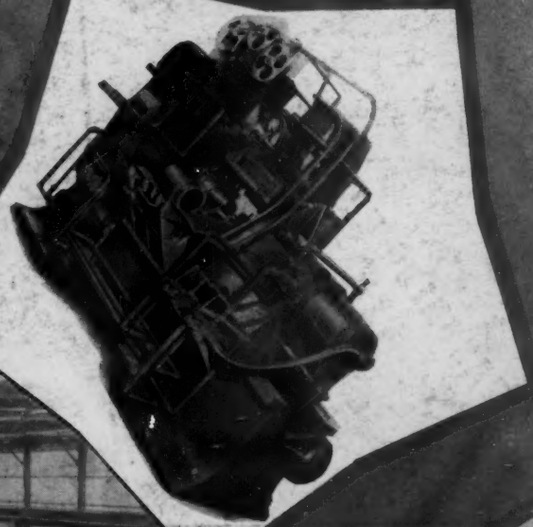

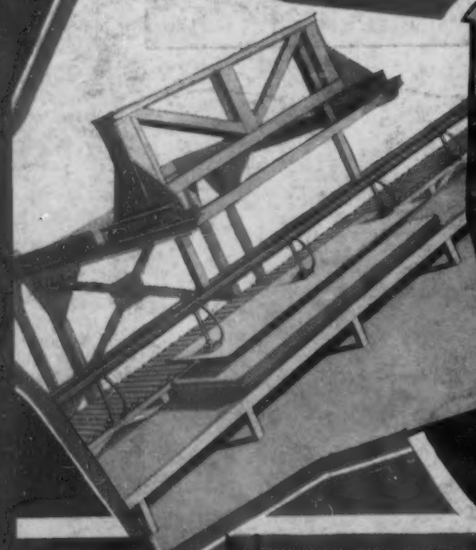

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